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WE have frequently been asked by consumers and producers of nickel in the United States and Canada to quote prices for this metal in our weekly review of the metal market, and in the future we shall do so. Transactions are usually made for long periods, the larger consumers customarily purchasing for six months or a year ahead, with monthly delivery, contracts being quite generally made at the end of each year. Prices, of course, vary considerably with quantities and delivery.

The price for nickel in small quantities is regulated by the general position of the European market, and is also somewhat dependent upon the stocks which are in New York. At the present time stocks are very light here, and the metal is selling in small lots at from 67½c. to 70c. With the increasing demand for nickel during the past two years for the manufacture of cartridges by European governments, German silver, nickel-plating, and the manufacture of ferro-nickel, although the last has not yet assumed great proportions, the consumption of nickel has undoubtedly increased considerably, and the supply is said by importers to be unequal to the demand in this country.

THE Anaconda mine, in Montana, under which name are included the so-called CHAMBERS' Syndicate Mines, as well as the Anaconda and St. Lawrence proper, is undoubtedly a magnificent property, and has produced a vast amount of copper and silver. During the past seven years, 1884 to 1890, inclusive, it has turned out about 151,000 gross tons of copper and a very large amount of silver. This property, it is reported, is to be floated in London and Paris in a company of very large capitalization, the actual price to be paid for the property being, we believe, $27,000,000, and of this, it is said, large advances have already been made by the ROTHSCHILDS, who are undertaking to bring out the new company.

The price, much the heaviest ever named for a metal mining property in this country, will undoubtedly appear to Americans to be very large, for, though the mine has been an immense producer, it is not generally supposed that it has been a very profitable mine to its owners. It is true, however, that fabulous amounts have been spent in a gigantic plant, which apparently was frequently unsuited to the work, if we may judge by the constant changes it has undergone.

This great property, developed with the most lavish expenditures, has never been cited in this country as an example of good management to be followed by other mines; in fact, the local administration in Montana has frequently been the recipient of extremely uncomplimentary remarks. It is claimed now that the Anaconda can put fine copper in the English market at £40 per ton, or say 10 cents a pound, but we are not informed whether this figure would include all "improvement account" expenditures.

It is well known that the grade of the ores of the Montana mines—of all American copper mines, in fact, except the native copper deposits of Lake Superior—declines as the mines attain depth. And it is said that the limit in depth of profitable ore in Montana, as thus far found, is above the 1,000-foot level. At present the average yield of Anaconda ores is said to be about six per cent.

THE PROPOSED CANADIAN LAW FOR THE SUPPRESSION OF MINING.

Mining investments in Canada have not usually been so profitable that they can stand any additions to the difficulties they now have to contend with, and it would be the part of wisdom if the governments of the several provinces were to relieve the industry as far as possible from unnecessary burthens and to seek in every way to attract capital to the development of Canadian mineral resources. The proposed new mining law of Ontario, of which the following are some of the provisions, seems eminently well calculated to discourage mining, and to deter capital from engaging in that industry in Canada:

"1. After the passage of this act the price of all crown lands to be sold as mining lands or locations in the districts of Algoma, Thunder Bay, Rainy River and that part of the district of Nipissing which lies north of the French River, Lake Nipissing and the River Mattawa shall be $5 per acre.

"2. The price of all other crown lands sold as mining lands or locations shall be $3 per acre.

"3. This section shall not apply to mining lands sold by the crown before the passing of this act, but for which the patent shall not issue until after the passing hereof.

"4. Where any locality or territory is shown to be rich in mines and minerals, the Lieutenant-Governor-in-council may by regulation set apart the whole or part of such locality or territory, and may fix the price per acre at any greater sum than is hereinbefore mentioned, or may temporarily withdraw the same from sale.

"5. All ores and minerals mined, wrought or obtained from lands located, sold and granted or leased by the crown after the passing of this act shall be subject to a royalty to the crown for the use of the province, whether such royalty be reserved in the grant, patent or lease, or not. The following specially named ores shall be subject to the royalty following: Silver, nickel and copper, 3%; iron, 2%. All other ores shall be subject to such royalty as shall be from time to time imposed by order-in-council, not exceeding 3%.

"All royalties shall be calculated upon the value of the ores in the pit's mouth and shall be payable at such time and on such terms, and the values shall be fixed and ascertained in such manner as shall be provided by regulation to be made by the Lieutenant-Governor-in-council in that behalf."

It is not surprising that the proposed law has raised a storm throughout the Dominion, and that meetings are being held in the mining districts to denounce it. It is indeed a very narrow and barbarous measure, and one which could only have been devised by some one profoundly ignorant of the needs of the mining industry and of the experience of other countries, particularly of the United States and Mexico, in the development of the mining industry which has contributed so greatly to their wealth and prosperity. We shall discuss this important subject again and more fully in our next issue, in the mean time our columns are open to those who wish to state the case of the miner and investor in Canada. Should this proposed law be enacted it is quite certain that it would effectually prevent the investment of American capital in Canadian mines.

HOW THE LEAD TARIFF HAS BENEFITED MEXICO.

When the question of imposing a tax on the lead ore of Mexico was first agitated the ENGINEERING AND MINING JOURNAL took the position, which it has since maintained, that such a step would work great injury to the mining industry of the western states, and also that its effect would be so far-reaching that it would be felt by the general industry of the country, and particularly of the southwest.

Our views were extremely unpopular in Colorado and Utah at that

time and for many months afterwards, but of late there has been a noticeable change in public opinion, and it is now apparent that thoughtful and representative mining men of these states are freely confessing that we were right and they were wrong. Indeed, the lessons of experience with the new tariff, which we have already described in these columns, have naturally brought about this change in sentiment. Many of those who a year ago advocated the exclusion of Mexican ores now desire to see that Chinese policy abandoned and the law repealed. The majority of miners have had their eyes opened to the manner in which they were deceived by the cunning beneficiaries of the present law.

The far reaching effects of this bad law are not easily removed, and even if the tax on Mexican lead were to-day revoked, and it is not likely that there would be much opposition to this, it would take a long time to overcome the mischief which it has worked.

American mining men, familiar with Mexico, are unanimous in the opinion that nothing else could have so greatly contributed toward the development of a Mexican metallurgical industry as this heavy tax upon the raw material which Mexico was exporting to the United States for treatment. Appreciating this fact, it is now possible that, were the United States to remove this import duty, Mexico would impose an export tax in order to continue the work of developing Mexican metallurgy, which our high-tariff advocates so stupidly inaugurated.

It is claimed by the advocates of our lead tariff, driven to their last stand, that, after all, the imports of Mexican ore have not greatly fallen off. This is true at present, but besides increasing the cost of silver-lead smelting in the United States, as we have already shown, it has induced American and European capitalists to invest in Mexico. Smelting works of large capacity are now in course of construction at Monterey and San Luis Potosi. Railways are being built to transport ores thither from the mines, and bullion and ores to the seaports for transmission to Europe for treatment. When these roads are completed our smelters will have strong competitors in the Mexican ore market, and the difficulty of securing any of these ores will become very serious.

While Mexican ore formerly came to the United States to be smelted and refined, Mexican bullion will now go to Europe to be refined; foreign ships will carry it instead of American railways; and Mexican credit balances, transferred to Europe from the United States, will be restored by exports of European, instead of American, merchandise to Mexico.

This change in the course of business must inevitably happen. Trade circulates like the electric current. It always seeks out the line of least resistance, and when stopped on one line by resistance it finds a shorter or easier circuit by some other line. As an instance of the manner in which trade will take any channel made easy for it, may be cited our commerce with the Hawaiian Islands. One of the principal importing merchants in Honolulu writing us under date of April 1st, 1891, says:

"Before the negotiation of the present reciprocity treaty with the United States a very large trade was done with Great Britain and Germany, but since 1876 the trade with those countries has diminished while that with the United States has increased until now the largest part is done with the latter country. Certain classes of goods cannot be had from the United States as cheaply as from the other countries mentioned, and will be continued to be imported, but anything that can be had from the United States at better figures will be imported from there. Our sugars are all sold in the United States and our interests lie with that country."

With Mexico and Canada, our next-door neighbors, reciprocity would be still more beneficial to us, for under it no other country could compete with the manufacturers of the United States in those markets. We, however, are more particularly interested in the bearing of the question on our mining industry and on our miners. It needs little argument now in Colorado to convince our dry-ore miners that the effect of excluding Mexican lead ores has been to increase greatly the smelters' charges, while since the price of silver has gone back where it was before this advance, they are getting much less for their ores than they did before. The voters are evidently changing to the other side of this question in Colorado, and it is reasonable to expect that some of the chief advocates of the Chinese policy will soon follow them.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and that of book buyers, give the retail price?—These notices do not supersede review in another page of the Journal.]

A Laboratory Manual of Chemistry, Medical and Pharmaceutical.—Containing experiments and practical lessons in inorganic synthetical work; formulæ for over three hundred preparations, with explanatory notes; examples in quantitative determinations and the nature of drugs, and short systematic courses in qualitative analysis and in the examination of urine. By Oscar Oldberg, Pharm. D., Professor of Pharmacy and Director of the Pharmaceutical Laboratories in the Illinois College of Pharmacy, and John H. Long, Sc. D., Professor of Chemistry and Director of the Chemical Laboratories of the Chicago Medical College and the Illinois College of Pharmacy. Second edition, revised and enlarged. With original illustrations. 457 pages. Published by W. T. Keener, Chicago, 1891. Price $3.50.

A Manual of Weights and Measures.—Including principles of metrology; the weights and measures now in use; weight and volume, and their reciprocal relations; weighing and measuring; balances and weights; measures of capacity; specific weight and specific volume, etc., etc. With Rules and Tables. By Oscar Oldberg, Pharm. D., Professor of Pharmacy and Director of the Pharmaceutical Laboratory in the Illinois College of Pharmacy. Third edition, revised. 256 pages. Published by W. T. Keener, Chicago, 1890.

Annual Report of the Department of Mines, New South Wales for the Year 1889. Illustrated, 253 pages. Sydney, 1890.

Contributions to a Catalogue of Works, Reports and Papers on the Anthropology, Ethnology and Geological History of the Australian and Tasmanian Aborigines. Part I. By R. Etheridge, Jr., Palæontologist to the Australian Museum and Geological Survey of New South Wales. 31 pages. Department of Mines, Sydney, 1890.

Contributions to the Tertiary Flora of Australia. By Constantin, Baron von Ettingshausen, Professor of Botany, University of Graz, Austria. Palæontology, No. 2. Illustrated, 189 pages. Department of Mines, Sydney.

Directory of Steam Users and Users of Machinery for New York and New Jersey. 258 pages. Published by the J. N. Mills Publishing Company, New York, 1891. Price, $5.

Examinations by the State Board of Health of the Water Supplies and Inland Waters of Massachusetts. 1887-1890. Part I of report on Water Supply and Sewerage. Illustrated; 857 pages. Boston, 1890.

Geological and Palæontological Relations of the Coal and Plant-bearing Beds of Palæozoic and Mesozoic Age in Eastern Australia and Tasmania; with Special Reference to the Fossil Flora. By Ottokar Feistmantel, M.D., C.M.R.S., New South Wales, etc., Professor in the Bohemian Polytechnic University, Prague. Illustrated, 183 pages. Department of Mines. Sydney, 1890.

Geology of the Vegetable Creek Tin Mining Field, New England District, New South Wales, with Maps and Sections. By T. W. Edgeworth David, B. A., F. G. S., Geological Surveyor. Department of Mines, Sydney. 169 pages.

La miniera cuprifera di Montecatini in val di Cecina. Memoria dell' Ing. A. Schneider. Illustrated, 85 pages. Firenze, 1890.

Le miniere di mercurio del monte Amiata.—Monografia di P. de Ferrari. Illustrated, 163 pages. Firenze, 1890.

Les theories modernes de l'electricité.—Essay d'une theorie nouvelle, par O. Lodge, F. R. S., professeur de physique à l' "University College" de Liverpool. Traduit de l'anglais et annoté par E. Meylan. Illustrated, 216 pages. Published by Gauthier-Villar et fils, Paris, 1891.

Mineral Products of New South Wales: Notes on the Geology of New South Wales, and *Description of the Seams of Coal Worked in New South Wales.* By, respectively, Harrie Wood, Under Secretary for Mines; C. S. Withinson, F. G. S., Geological Surveyor in Charge, and John Mackenzie, F. G. S., Examiner of Coal Fields. Department of Mines. Illustrated, 185 pages. Sydney.

Records of the Geological Survey of New South Wales. Illustrated, 263 pages. Department of Mines, Sydney. Vol. I., 1889; Vol. II., 1890.

The Fossil Fishes of the Hawkesbury Series at Gosford. By Arthur Smith Woodward, F.Z.S., F.G.S., of the Department of Geology and Palæontology, British Museum, London. Palæontology, No. 4. Illustrated, 55 pages. Department of Mines. Sydney, 1890.

The Invertebrate Fauna of the Hawkesbury Wianamatta Series (beds above the productive coal measures) *of New South Wales.* By Robert Etheridge, Jr., Palæontologist to the Geological Survey, Department of Mines. Palæontology, No. 1. Illustrated, 21 pages. Department of Mines, Sydney.

The Mesozoic and Tertiary Insects of New South Wales. By R. Etheridge, Jr., Palæontologist and Librarian to the Geological Survey of New South Wales, and the Australian Museum, Sydney; and A. Sidney Olliff, Government Entomologist, New South Wales. Palæontology, No. 7. Illustrated, 12 pages. Department of Mines. Sydney, 1890.

The Metallurgy of Gold. A practical treatise on the metallurgical treatment of gold-bearing ores, including the processes of concentration and chlorination, and the assaying, melting, and refining of gold. By M. Eissler, mining engineer and metallurgical chemist, formerly assistant assayer of the United States Mint, San Francisco, author of "Modern High Explosives," "The Metallurgy of Silver," etc., etc. Second edition, enlarged, with 132 illustrations. 340 pages. Published by Crosby, Lockwood & Son, London. Price $3.50.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Costs of Production of Fine Copper.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The Torch Lake *Times* comments on my letter (ENGINEERING AND MINING JOURNAL of March 21st), relating to actual costs of copper. It is true, as the *Times* states, that none of the companies charges up anything for interest on capital invested, or for the wear and tear of machinery or for depreciation of plants—items to be considered and which would materially add to the cost of the copper produced and reduce imaginary profits.

When an ore body gives out and a mine becomes unworkable and valueless, there is no other way to do but to charge it off in a proper yearly deduction of a certain percentage on the real estate and for wear and tear of machinery, etc. Stockholders should insist upon obtaining plain reports and business-like accounts showing real net earnings. The continual issue of bonds redeemable within ten years, against an indefinite construction account simply tends to postpone the final adjustment, while at the same time it depreciates the intrinsic value of the stock.

Accidents, like the fire at the Pewabic, last year's fire at the Huron, explosions of boilers, breaking of dams, etc., should be heeded; they indicate plainly the duties of directors of companies to create a reserve fund for an emergency, even by curtailing current dividends, if there are any.

The tendency of the copper market is still downward. Since Lake copper is reported to have been offered at £60 or 12¾ cents per pound c. i. f. in Europe, consumers have even been more reluctant to buy than before.

and this on both sides of the Atlantic. It is a fact that consumption in this country has steadily fallen off since the price was put up to 17 cents last year, and stocks are increasing.

There are but two ways to rectify the present disastrous condition of this market in order to harmonize production and consumption. Either the different companies have to come to an understanding to restrict their production at the rate of about 20 per cent., and such an agreement to be honestly kept up, or the price of the raw material has to be reduced voluntarily, say for Lake to perhaps 12 cents, and 10½ cents for casting copper. This would soon force a good many mines to shut down; then the surplus stock, with the current production, could be absorbed gradually by the increase in consumption which lower prices invariably bring about.

It should be borne in mind that the end of the Chilian crisis is approaching, and that the shipments of Chili bars to England will then be taken up, lessening our exports to Europe. S.

NEW YORK, April 15th, 1891.

[We think our correspondent is somewhat pessimistic as regards the copper market, but he is undoubtedly correct in his advice to mining companies to provide for the gradual extinguishment of their capital account. Under the present practice it is only after a mine is worked out, and the stockholders have lost their money, that it is possible to ascertain what it costs to produce copper.

The statistical position of copper is undoubtedly strong. Except in this country, stocks have been declining and production decreasing, while here the production this year will probably not exceed that of 1890. Though consumption will be less in 1891 than in 1890, there is nothing to indicate a permanent reduction in the use of copper. The temporary dullness in trade will not check the extension of electrical appliances, which call for the use of large amounts of copper, and at present prices for the metal it will also enter largely into decorative uses. ED. E. & M. J.]

Where the Comstock Stockholders' Dividends Go.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: We again take the liberty of forwarding you a tabulated statement analyzing the last quarterly bullion reports of the ore-producing mines of the Comstock lode, and trust that you will find it of sufficient interest to publish for the perusal of your numerous readers.

ANALYSIS OF BULLION REPORTS OF THE COMSTOCK MINES FOR QUARTER ENDING DECEMBER 31ST, 1890.

Name of mine.	Tons of ore extracted.	Gross yield.	Costs and charges.	Profit.	Loss.	Aver. yield per ton.	Aver. pulp assay.	Per cent. of pulp saved.	Yield if 90% had been saved.	Profit if 90% had been saved.
Con. Cal. & Va..	21,340	$275,496	$292.261	.....	$16,765	12·90	20·04	64·37	$384,760.20	$92,499.20
Savage..	9,622	130,058	142,278	.....	12,220	13·52	20·02	67·53	173,292.22	31,014.22
Chollar..	6,765	84,520	110 470	.....	25,950	12·49	19·62	63·60	119,469.90	8,999.90
Ov'rman	5,150	68,110	74,458	.....	6,348	13·23	17·35	76·25	89,352.50	14,894.50
Justice..	2,359	41,478	48,606	.....	7,128	17·20	22·92	75·43	49,491.37	885.37
Cr'n P't.	3,787	34 571	55,650	.....	21 079	9·12	14·74	63·30	50,215.62	1,6 9.62
Belcher..	3,750	45,747	62,682	.....	16,935	12·20	21·13	57·73	71,287.50	8,605.50
Occid'ntl	4,257	78,273	75,956	23·17	.....	18·38	.....	89·70	.....	.....
C'nfid'ce.	72	882	10,841	.....	9,959	.....	.....	.....	.....	.....
Con. Im.	1,135	15,641	42,648	.....	27,017	13·25	.....	.....	18,723.00	.....
Ch'll'nge	125	1,643	15,718	.....	14,075	13·15	.....	.....	.....	.....
Y w J'k't	4,849	61,218	90,102	.....	25,884	18·60	.....	.....	77,060.00	.....
	63,251	$840,637	$1,021,680	23·17	$183,360				$1,033,652.31	$158,508.31

The Yellow Jacket Mining Company, being a Nevada corporation and under the control of as conscienceless a gang as can be imagined, does not publish a full statement of its work nor keep such a statement on file in the transfer office in this city. It is therefore impossible for us to obtain exact figures, and those given are estimated from such data as could be obtained. Enough, however, is known to lead us to believe that the rock from the mine is continually graded to a milling proposition of about $18 per ton, and the output enables the chief owners of the mills to grow rich on what properly belongs to the stockholders of the mine. As seen from this statement, but one company, the Occidental, paid a profit during the quarter, and that one admitted saving 89·7% of the battery assays, while none of the other companies admits having saved even 80%.

The showing of the Consolidated California & Virginia is certainly not calculated to increase or continue confidence, if any remains, in the present management. If the mills cannot save more than 64·37% of the battery assay (without considering the actual assay value of the rock before it is handed over to the mill thieves), it is time the directors of the mine made other contracts, and, if they neglect to do this, the stockholders should hold them responsible. Such a showing is simply scandalous, and any one that would buy shares in a property managed in such a dishonest manner must expect to lose his money. Other mines in Nevada are saving 90% of their pulp assay, and the mills reducing the Consolidated California & Virginia can do the same if they are compelled to. The Comstock Mill Company, which is reducing the rock from this mine, is owned to the extent of one-third by one of the reputed managers of the mine, and the value of the slimes and tailings now going to the mill-owners would decrease if the extraction was what it should be.

The ore taken from the Occidental mine is the worst on the lode to work, being full of greasy clay. It does not amalgamate well, and the mills are compelled to concentrate it. Yet with all these difficulties to overcome, they save nearly 90% of the pulp assays, while Consolidated California & Virginia, with free-milling ore, saves only 64.37%. The explanation is that the Occidental company owns its own mill, while the Consolidated California & Virginia does not. The Chollar mine saves but 63·60% of the battery assay. It is probable that the croquet ground is not quite paid for as yet, and a few more tailings and slimes were required to gild the posts and finish up things. Crown Point, Belcher, Confidence, Consolidated Imperial, and Challenge are all under the control of the infamous mill ring.

The managers of the Alta mine have been particularly reticent during the quarter. No value is given for the rock they have taken out, and the usual quarterly report was not published in the Virginia papers at the time the other mine returns were given. Whether the gang in control has at last succeeded in digging up the shaft and retailing it for postholes to be used in the new Nevada irrigating districts cannot be certainly determined, but time will tell. The history of the last three quarters of the year 1890 shows how profitable it has been for the Comstock millowners, but, alas! how the poor shareholders have been singed to make this prosperity.

It is as follows:

1890, quarter ending—	Tons extracted.	Gross yield.	Gross yield if 90% had been saved.
June 30th.....	87,303	$1,275,102.19	$1,748,228.99
September 30th.....	69,477	935,655.56	1,250,373.23
December 31st.....	63,251	840,637.00	1,033,652.31
Totals.....	220,031	$3,051,394.75	$4,032,254.53

They received during these nine months for milling 220,031 tons at $7, $1,540,217; difference between the per cent. given by companies and 90% they should have given, $980,859.78, making the sum of $2,521,076.78, which went to them according to the published figures.

It must be remembered that all this time the shareholders of most of these companies have been assessed to extract this ore, whereas, had it been honestly handled, and at fair milling charges, it would have paid large dividends.

This statement shows how it is that these mill-owners can buy themselves high places in the nation, in which they pose as benefactors of the poor people at large, and from which they preach "free silver coinage."

Yours truly,

MINING STOCK ASSOCIATION,
per J. H. Tingman, Secretary.

SAN FRANCISCO, April 10, 1891.

ON THE PROGRESS MADE IN HEATING PROCESSES AND IN THE MANUFACTURE OF HEAVY CHEMICALS DURING THE YEAR 1890.*

Written for the Engineering and Mining Journal by G. Lunge, Ph.D., Professor of Technological Chemistry, Polytechnic School, Zurich.

The following remarks are more intended to convey to the reader a general impression on the progress made during the year 1890 in heating processes and in the manufacture of heavy chemicals than to enter into any details about any of the processes mentioned.

We commence our task with a question of a general character, of paramount importance for every manufacturing process, nay, for civilized life altogether—that is, the proper utilization of mineral fuel. Some years ago great hopes had been called forth that *water-gas* was to be the fuel of the future. It is well proven that this gas was originally invented more than a hundred years ago and tried several times over in Europe, but that its permanent introduction as a paying process is due to the exertions of several American inventors. In America water-gas has found its principal application as an illuminant, or rather as the carrier of the illuminating power of naphtha vapors. Being considerably cheaper than coal-gas made by the old process of distilling bituminous coal in retorts, water-gas has superseded the latter in about a third or the fourth of the gas-works in the United States, and it seems still to be on its onward march. A certain check to this progress has been given by the action of the authorities of the State of Massachusetts, the reason for this action being the indisputable fact that water-gas is far more poisonous than coal-gas (as we will term the gas made in retorts from coal alone). This is owing to the fact that water-gas contains about 30% or 40% of carbon monoxide, while coal-gas contains only from 6% to 8% of this compound, which has been recognized as the almost exclusive cause of the deleterious property of illuminating gas. This is not a question of some theorist's quibble, but it is a hard fact that the accidents caused by water-gas are alarmingly high, and far and away exceed in number those caused by coal gas. Undoubtedly the number of accidents would be far greater still, and would in reality make it impossible to employ water-gas as a general commodity carried into the consumers' houses by a general service of pipes, if we had to deal here with pure water-gas, that is, the mixture of carbon monoxide and hydrogen produced by the action of steam on red-hot carbon, a mixture devoid of any smell. But in reality what is called water-gas in America is a mixture of real water-gas with a large proportion of more or less decomposed naphtha vapors which impart to it a strong smell, and thus render any escapes of it through leaking pipes or open taps nearly as perceptible to the senses as those of coal gas.

In Europe the case is quite different. In the first instance, most of the coal is not of the most suitable character for the manufacture of water-gas, the splendid anthracite used in the United States not being available there; but this is only a secondary matter, and it is all the less important since hitherto a sufficient quantity of "coke-breeze" has been obtainable for the European water-gas works. What is of more importance, Europe does not produce any considerable quantity of the light petroleum naphtha or of any analogous product, and from this follow two very great drawbacks. The first is that a totally different agent must be sought for rendering water-gas luminous. Such an agent was first sought in platinum spirals made incandescent in the very hot water-gas flame; more recently that very costly body has been replaced by thin sticks of magnesia arranged in the fashion of a comb suspended over the flame (Fahnehjelm's patent). A very fine, steady and white incandescent light is thus obtained, but the magnesia combs must be renewed in comparatively short intervals, which increases the cost and causes some trouble. The second drawback is that the European water-gas is practically inodorous, and it could not be thought of allowing it to be distributed in service-pipes, at an enormous risk of causing accidents by poisoning. Many natural and artificial substances have been tried for the purpose of imparting the necessary amount of smell to water-gas, but none of them has been successful to that extent that any municipal authority, or even (with one or two exceptions) any private manufacturing firm in Europe, has ventured to introduce the Fahnehjelm light or any other form of applying water-gas as an illuminant, and it must be pronounced as a fact that hitherto water-gas

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has not entered into serious competition with coal-gas, so far as Europe is concerned, and is not likely to do so in the near future.

This state of matters would be changed, and the first objections made to the use of water-gas from a sanitary point of view would vanish, if it were found possible to remove the carbon monoxide from water-gas in some economical way. So far no process is known for this purpose, but I may be allowed to allude in a few words to a most interesting discovery by Messrs. Mond, Langer and Quincke, made in 1890. These chemists have found that metallic nickel at a moderate heat combines with carbon monoxide to a volatile liquid, which has the composition $Ni(CO)_4$ and represents a totally new type of chemical compound. It does not seem quite impossible that this reaction, or a similar one (for it is unlikely that nickel should be the only metal available for this purpose), would offer the means of removing carbon monoxide from gaseous mixtures. Nobody is better aware than the writer how many elements are still missing to render such a process practicable for manufacturing purposes, and, indeed, how slight is the probability of success in this direction; but the extraordinary scientific interest attaching to that new type of compound, and the wide prospect it opens before our eyes, may excuse my mentioning the above as a bare technical possibility.

While the employment of water-gas as an illuminant seems to be almost shelved in Europe, that gas has been vigorously taken up there as a prominent *heating agent*, especially since the apparatus for producing it had been greatly improved and adapted to European fuels in the first instance by Mr. E. Blass, of Essen, and other German engineers. The more uncompromising advocates of that gas went so far as to lay down the proposition that water-gas was *the* proper form of using mineral fuel; that ordinary producer—Siemens—gas, nay, even the combustion of coal on ordinary fire-grates, must be abandoned for water-gas, which was thus to be looked at as the "fuel of the future." Some over-zealous partisans overstepped the mark so far as to publish calculations, according to which a certain amount of carbon was to do more theoretical duty after it had been used for decomposing water than when burned directly. That would mean the same as obtaining 120 cents as change for a dollar, or any other equally impossible form of raising something out of nothing; all of them sin against the great law of the conservation of energy. Let practical men poke ever so much fun at theorists, and point to alleged refutations of scientific theories by facts of experience, but if they attempt to run counter to the fundamental laws of nature, such as that just quoted, they will always find them hard *facts*, considerably harder than their own skulls. Where is to-day Dr. Holland's system of cheap heating by means of naphtha and superheated steam, or the Keely motor, and *id genus omne*?

It would, however, be unjust to tax the majority of the European advocates of water-gas with such crude notions, least of all a high-class engineer like Mr. Blass and his eminent coadjutors. But their calculations and assertions concerning the superiority of water-gas as fuel over other modes of heating, although they were not irrational on the face of it, have not stood either scientific scrutiny or the test of prolonged practical experience. We must, from the outset, dismiss the idea that water-gas could ever compete in cheapness with the direct use of coal or with Siemens gas, except in special cases, viz., where an unusually hot flame is required or where the gas has to be cooled down and carried for long distances in pipes. We must consider that a certain part of the energy of the coal is absolutely wasted into converting water into steam, whilst at the end of the process—that is, after combustion—steam is re-formed, but not recondensed into liquid water, being carried away into the atmosphere in the state of vapor. This is a loss, demanded even by theory, and amounting to 7% of the total energy of the coal. Moreover, the manufacture of water-gas is not practicable except as a discontinuous process, "blowing hot," that is, with air, being necessary for at least twice as much time as can be spent in "blowing cold," that is, with steam. But in hot-blowing four times as much ordinary producer-gas is made as water-gas in cold-blowing, and the aggregate heating value of the former, which is mostly difficult and often impossible to utilize at all, far exceeds that of the latter. Consequently water-gas, although even under these conditions cheaper than coal-gas made in retorts (where two thirds of the weight of coal remains behind in the shape of coke), is much dearer than Siemens gas, when the latter is used hot (as it ought to be), or than the direct combustion of coal. Only when the peculiar property of water-gas of burning with an extraordinary short and consequently *hot* flame can come into play, as in the welding of wrought iron tubes and in a few other isolated cases, its use is of undoubted advantage. But even in such cases as in open-hearth steel furnaces, where great expectations had been entertained of realizing a considerable saving by the use of water-gas, there has been disappointment all round. A glowing description of the success of that process at the great Wittkowitz works in Austria made the round of the technical periodicals a year or two ago; the best comment on this is the fact that the Wittkowitz water-gas plant has been replaced by Siemens producers. Nor have the strenuous efforts of Mr. von Langer to introduce the use of water-gas in England met with any considerable response there. As the case stands at present, we must say that water-gas, except in a very few cases of the above-mentioned description, has proved a failure as an *economical* kind of fuel, and in *Europe* also as an illuminating agent, although for very different and possibly removable reasons.

It should not be overlooked that sometimes the name "water-gas" is wrongly applied to Siemens gas, manufactured with introduction of as much water as can be done without reducing the temperature of the gas-producer below the point where a continuous process is possible. This limit seems to be reached when about 0·7 pounds of water is introduced for each pound of carbon. In this case the temperature remains at a good red heat, and, although a good deal more carbon dioxide is formed than in a dry producer, that drawback is more than counterbalanced by the introduction of from 10 to 15 per cent. of hydrogen into the gas, and by the greater ease of dealing with the coal ashes, which do not flux in consequence of the lower temperature. Many special producers have been designed for this kind of gas, which I have termed "semi-water gas," and which is rich enough for use in Otto gas engines. The producers of Schilling, Wilson, Dowson and many others belong to this type, which seems destined to a great future, but which must be considered simply as an improvement of the Siemens producer, not essentially deviating from it in principle, as does the water-gas apparatus properly so called.

A year or two ago great expectations had been roused by the statements published upon the process of Ludwig Mond, which consists in treating red-hot coal with superheated steam and air in certain proportions, and submitting the gaseous mixture thus obtained to a washing process in order to recover the ammonia generated by the action of the steam upon the nitrogen of the coal. It was claimed that in this manner an enormous gain of ammonia was effected in comparison with that which is obtained in the distillation of coal for the manufacture of illuminating gas, or for that of coke, and that the resulting gas still represented two-thirds or three-fourth of the original heating value of the coal. A revolution of the whole system of employing fuel was to follow from this process, coupled with incalculable advantages to agriculture from the immense quantities of ammonia thus recovered from what hitherto has been a total loss, viz., the nitrogen of coke. This was truly a grand conception, nor was it merely the crude idea of a theorist, for Mond's process has been put into successful operation on the largest scale at the world-famed works of his firm (Brunner, Mond & Company's Alkali Works at Northwich). But impartial observers must from the first have raised this objection: That the large quantity of ammonium salts obtained by Mond's process must soon depress the value of ammonia below the point where a process, in which one-third of the heating value of the coal is sacrificed, and which implies very costly new plant, troublesome and expensive to work and keep in order, ceases to be remunerative. So much is certain that the year 1890 has seen no further development or extension of Mond's process, and the United States' farmers need not yet apprehend any diminution of the exportation of bread stuff in consequence of any addition to the resources of their European competitors from the above cause. Still, attention must be kept upon that process, and it is at all events satisfactory to know that there is a large source of ammonium compounds, hitherto scarcely touched, available for the future uses of mankind.

When discoursing upon the question of fuel, American readers will naturally expect to hear something about those descriptions of fuel with which nature has blessed their country in preference to all others, petroleum and natural gas. But the writer feels that he would here tread upon ground less familiar to himself than to those whom he would fain instruct, and he therefore abstains from any remarks upon that tempting subject. They are already aware that natural gas has been broached in the greatest English iron-producing district, the Cleveland district, but so far not much importance seems to attach to that discovery.

We pass over to another topic, which is equally of paramount interest for the chemical industries as well as for metallurgy, nay, even for the whole civilized world, that is, the preparation of cheap oxygen from atmospheric air. It is now some years since the brothers Brin took an important step in developing the baryta process, first indicated by Boussingault and later on attempted on a manufacturing scale by Tessie du Motay. That process consists in passing atmospheric air over barium oxide at a low red heat (say 600° C.), thus converting it into barium dioxide and, in a second operation, shutting off the air and raising the temperature to a bright red heat (about 850°), at which pure oxygen is given off, whilst barium oxide remains behind, and the process can be started as at first. each operation occupying about four hours. Tessie du Motay failed in his endeavors, because the barium oxide soon ceased to be an active absorbent of oxygen. Brin Brothers found that this is merely owing to the carbonic acid, moisture and other impurities contained in ordinary atmospheric air; when these are removed, which can be done with very little expense by means of caustic lime, the same quantity of baryta may serve for an indefinite period as an agent for extracting pure oxygen from atmospheric air. This process was taken up by an English company, whose engineers greatly improved the mechanical arrangements, whilst their chemist, Dr. L. T. Thorne, did very important work toward developing the uses of pure oxygen. Recently a most important step has been taken. It has been found that it is unnecessary to perform the process of absorbing and re-expelling the oxygen at different temperatures, which necessarily entails great waste of fuel and wear and tear of the retorts. In lieu of changing the temperature, it is sufficient to change the pressure. If, at a moderate red heat, say 700° C., atmospheric air is passed over the baryta under a pressure of 1½ atmospheres, a considerable quantity of its oxygen is retained in the shape of barium dioxide; and if, without altering the temperature, the air is shut off and a vacuum of $\frac{1}{15}$ to $\frac{2}{15}$ atmosphere is produced, the oxygen previously absorbed is given off in a pure state. These operations are performed by the alternate action of a compressing and an evacuating pump, all necessary changes being made automatically in very short periods, say 10 or 15 minutes. This has rendered the manufacture of oxygen cheaper than it has ever been before, viz., 7 shillings per 1,000 cubic feet, inclusive of wear and tear and depreciation of plant, and this is no more a matter of experiment, but a fact realized by more than a year's continuous working at London, Manchester, and Berlin. The above cost refers to a daily production of 10,000 cubic feet oxygen per 24 hours. Large quantities of oxygen are manufactured and sent out in iron cylinders, in which it is compressed to 100 or 120 atmospheres. Its principal use has hitherto been in the purification of coal gas, where it is practically employed in removing the sulphureted hydrogen from the gas in the shape of free sulphur, without the necessity of frequently changing the oxide of iron purifiers (Valon's process). Other uses, as for bleaching, for aging whiskey, for converting linseed oil into varnish, and so forth, are still under trial.

During the year 1890 a new process for manufacturing cheap oxygen has been invented by Dr. George Kassner, of Breslau, who claims to work even more cheaply than it is possible by the Brin process. A mixture of lead oxide and calcium carbonate absorbs at a dark-red heat oxygen from the air, a compound of lead dioxide with calcium oxide ("lead plumbate") being formed, from which carbonic acid drives off pure oxygen, while the residue is again fit to take up oxygen from the air, and to serve an indefinite number of times for the same purpose. The inventor has held out in several periodicals the most fascinating prospects for cheapening manufactures all round by means of his process, which is to furnish oxygen at an incredibly low cost, and he has actually succeeded in selling a license for his process to Friedrich Krupp, at Essen, which firm is going to try its value for metallurgical purposes; but it is as yet impossible to say whether Kassner's process will fulfill even partially the

great expectations of its originator, and most certainly it won't fulfill them to their whole extent.

In the manufacture of *heavy chemicals*—that is, sulphuric, hydrochloric and nitric acid, sulphate of soda, soda ash, chlorine, etc.—last year has not produced any fundamental changes; but it is not impossible that such will follow from inventions brought out in that year. More stir than by any technical improvement has been made by a business fact of paramount importance, viz., the amalgamation of nearly all the British Leblanc alkali works, under the style of the United Alkali Company, Limited. The renowned historical firms of Tennant, Muspratt, Kurtz, Gaskell & Deacon, Sullivan, Allhusen, Jarrow, and a host of others will not be heard of any more after the period of liquidation has passed. Their former owners are now only shareholders, or at best directors, of the new company. Only Gambles and Chances are left now. Will that extinction of all individuality in the leading alkali-making country, unheard of in chemical manufacturing up to this day, promote or, on the contrary, keep back the spirit of invention and the introduction of fundamental changes? Only the event can decide which of these two alternatives will follow. So much is certain, that the foundation of the United Alkali Company is intended to prop up the British Leblanc alkali manufacturer against his more fortunate competitor, the ammonia-soda manufacturer. The imposing array of immense works held together by the name of Solvay is more and more extending in all manufacturing countries, and has already successfully invaded the domain of caustic soda, formerly held to belong to the Leblanc process.

Alongside of the Solvay works, which are on the whole carried on on the well-known lines, other works have been started in England, Germany and France which carry out the ammonia-soda process by means of other apparatus, and most of these prosper as well, while the Leblanc works are carried on either at a very small profit or even at a dead loss. Already for some time past the relative importance of the various branches of their manufacture had undergone a thorough change. Soda, even caustic soda, had become a secondary product, whose price had to follow the lead of the Solvay works, while hydrochloric acid, formerly neglected or even entirely thrown away at many of the Leblanc works, now occupied the place of honor. That acid, and the chlorine product manufactured from it, principally bleaching-powder and chlorate of potash, had to indemnify the Leblanc alkali-manufacturer for his losses on soda, and procure to him whatever small profit there might be left over. This was possible, because hitherto the numerous and energetic attempts of Solvay himself and other inventors at making the manufacture of hydrochloric acid and chlorine a regular and paying part of the ammonia-soda process have failed. Even in the future, complete success in that field is not very probable, according to thermochemical considerations which I have developed in a paper of mine some time ago.

But taking it for granted that that last redoubt of the Leblanc men will not be stormed by the Solvay men, it is nevertheless in great danger from another quarter. A host of inventors has been attacking the problem of manufacturing hydrochloric acid and chlorine from magnesium chlorides. So far as that substance has to be produced artificially, as has been over and over again proposed in connection with the ammonia-soda process and otherwise, the Leblanc men need not apprehend any furious inroad into their preserve. But it is well known that enormous quantities of a saturated solution of magnesium chloride are continually run to waste at the Stassfurt potash works, sufficient to cover the entire present consumption of chlorine products in the world. For a number of years past many chemists, both at Stassfurt and elsewhere, have been working at that matter, and several times it has been announced to the world that final success had been attained in utilizing the magnesium chloride. Probably the greatest interest in that direction has been aroused by the Weldon-Pechiney process; but that process seems to hang fire, nor have the various inventions practiced at Stassfurt itself so far influenced the chlorine market, and some breathing-time seems at all events still granted to the Leblanc works.

So much is certain that up to this moment practically all chlorine products are furnished by the Leblanc works, which have been thereby partly enabled to keep over water, although the smaller factories one after another have been compelled to close. Indeed, the tide seemed to turn in their favor by the grand success of the Chance process for recovering, from that bug-bear of alkali works, the "tank-waste," sulphur in the state of chemical purity, worth four or five times as much as had been paid for it originally in the shape of pyrites. Unfortunately the Chance process, which appeared to be the closing link and consummation of the range of processes connected with the Leblanc process, seems to be saddled with some drawbacks which have not yet been entirely overcome. The complaints of nuisance in some places are worse than ever before, and the economical side of the picture is by no means as bright as it was first painted, but in both respects longer experience may be expected to improve matters.

Another problem is that of making the fullest possible use of the chlorine contained in hydrochloric acid itself, only a quarter of which is at present utilized in the Weldon process, or a third in the Deacon process. Although the superiority of the latter over the former has been demonstrated long ago, most manufacturers still stick to the Weldon process, dreading to incur the very large outlay for a Deacon plant in the face of the crowd of new processes professing to be vastly superior to the latter. The last year has been specially fertile in that field. Quite a number of inventors have worked at various forms of the reaction where chlorine is produced by the mediation of nitric acid, the nitric acid being continually regenerated by means of "plate-columns" or similar apparatus. Of other processes I will only mention that of De Wylde and Reychler, of Brussels, as having attracted most attention. It really does seem as if great changes were impending in that quarter.

In this connection we draw attention to the interesting fact that chlorine, in spite of its paramount corrosive properties, has now entered the ranks of those gases which are on a large scale compressed into a liquid and sent out in iron boxes, like sulphur dioxide, carbon dioxide, and ammonia (to which class must be added compressed oxygen, although it is not liquified). Liquid chlorine is now sent out to distant countries, and may yet play an important part in the extraction of precious metals, to which application I would draw special attention. A great drawback to that way of handling compressed gases is the cost and dead weight of the iron bottles used; but perhaps the Mannesmann tubes, which aroused such interest at the international meetings at Pittsburg last year, will produce a marked improvement in the above-mentioned respect, since their weight is much less than that of ordinary welded iron or steel tubes of the same tensile strength.

While the present Leblanc and ammonia alkali-makers, and a host of inventors of new processes, are all striving for the palm of success, a most formidable competitor to them all has arisen, who had been hitherto looked down upon as practically out of the field. The problem of decomposing alkaline chlorides by *electricity*, attacked as it had been from many quarters, had certainly not been solved as a *paying* process until the most recent times. At the Paris Exhibition in 1889 the writer had a special opportunity of convincing himself that the process of Gall and Count Montlaur for manufacturing chlorate of potash from the chloride by electricity was more than an experiment or a plaything, and, in fact, that process is now carried out in Switzerland with a water-works of 700 horse-power. But chlorate of potash is a somewhat expensive article, saleable only on a very restricted scale, and offers no solution to the main problem, that of splitting up alkaline chlorides into caustic alkali and free chlorine. Now, in the course of 1890, that solution seems to have been at last found, less by some new and special inventions than by carefully elaborating the details of plant and working conditions of well-known processes. At the Griesheim Chemical Works, near Frankfort, potassium chloride is now regularly decomposed by electricity, and both caustic potash and bleaching powder are sold from that source; nor is there, as it appears, any obstacle to applying the same principle to sodium chloride, so that the manufacture of soda in the same manner is only a question of time. Even if at the present moment the conditions of producing and applying electricity sufficiently cheap for the decomposition of sodium chloride are not yet entirely attained, there can be no reasonable doubt that any gap still open in that respect will soon be bridged over, and that in the future electrolytically made soda will appear in the market.

Even further than that, go the attempts at applying electrolysis to the direct bleaching of textile materials and paper pulp; for in this case the expense of converting the crude products of decomposition into commercial articles would be avoided. A few years ago a great deal of noise was made about L'Hermite bleaching process, but, in spite of the strenuous advocacy of several well-known chemists, it must have been a failure, since the only English paper works which had introduced the process have given it up and dismantled the apparatus. At this moment the Kellner process is to the fore, which goes much beyond L'Hermite in utilizing not merely the chlorine, but also the alkali formed in the electrolysis of sodium chloride for directly bleaching paper pulp. So far the reports on the success of this process, as carried out at a large English paper works, are eminently satisfactory, and unless a similar disappointment is to follow, as in the last-mentioned case, the Kellner process would close up one of the most important outlets for both bleaching powder and alkali.

We now turn to a branch of manufacture which does not now possess as much importance for the alkali manufacture as it used to do before the days of the ammonia soda process, but which still forms the groundwork of all chemical industries in general; that is, the manufacture of *sulphuric acid*. In the United States there exist far more than 100 vitriol works; and in Europe, although a large proportion of alkali is now made without its help, the manufacture of sulphuric acid, so far from decreasing, is steadily extending. Undoubtedly this is mostly due to the enormous and most legitimate extension of the manufacture of *artificial fertilizers*, which nowadays form one of the most important branches of chemical industry. The consumption of sulphuric acid for the manufacture of superphosphate is enormous, and the newly-discovered deposits in the Somme district in France, but even more so those of the southern states of North America (South Carolina and Florida) secure a certain supply of the other ingredient necessary for that manufacture. This extension of the manufacture of superphosphates is all the more remarkable, as in Continental Europe an important competitor has arisen in the slags from the basic steel process, which need only be finely ground to serve as an excellent manure. Another considerable outlet for sulphuric acid is the manufacture of nitric acid and of the modern explosives, which are now taking the place of the ordinary black gunpowder to a large extent, and have practically driven it out of the field for many peaceful purposes, as those of the engineer and the miner, while they threaten to do so even for military purposes in the shape of a "smokeless powder."

Nobody is better aware of the almost innumerable improvements, or proposals of such, in the apparatus and manipulations of sulphuric acid manufacture than the writer, who has had to go over this field in preparing the new edition of his "Treatise on Sulphuric Acid," which is to appear in the course of this year. Some of these proposals have emanated from myself. They are based on the "nitrosyl-sulphate theory" of the formation of sulphuric acid, enunciated by me some years ago, which I have had the satisfaction of seeing approved by all later observers, after the ingenious but altogether imaginary "hydroxylamine" theory of Raschig had been definitely disposed of. The proposals made by me, and substantially confirmed by several other workers in that field, refer to a great reduction of the enormous space at present occupied by the ordinary leaden vitriol chambers, which entails a corresponding reduction of first cost. It would exceed the scope of this article to go into any details on those proposals, in which the "plate columns," invented by myself and improved and manufactured by L. Rohrmann, play the most important part.

The manufacture of Nordhausen sulphuric acid has taken a great extension in Germany; in England it is represented by only one works, and in other countries (excepting, of course, the original Bohemian factories working with schist), it is of very little importance. Nearly all the new processes utilize the catalytic action of finely divided platinum, known long ago, but greatly extended in 1875 by Clemens Wenkler. Many special processes, all of them kept very secret as to their details, are in use for that manufacture; one of the best of them is founded on the extraction of pure sulphur dioxide from metallurgical gases, especially from roasting blende, by the Schroeder & Haenish process. The last-mentioned process has also created the industry of liquid sulphur dioxide, which is sent out not merely in iron bottles, but in tank wagons holding 10 tons each, and is largely used in the manufacture of wood pulp, and for other purposes. So far, that industry has been confined to Germany, where I have convinced myself personally of its technical success.

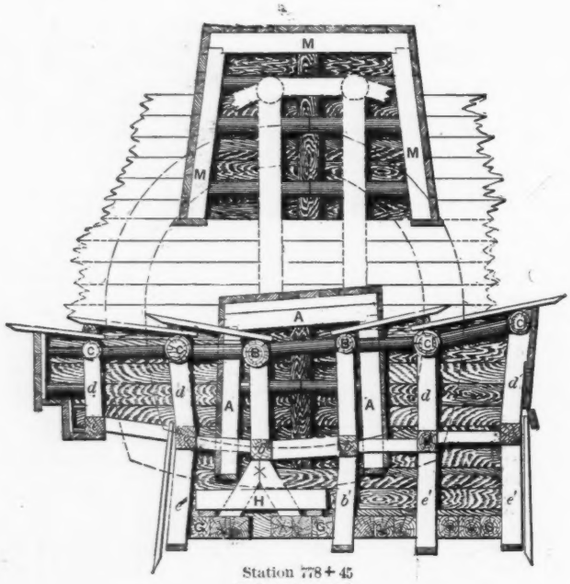
THE NEW CROTON AQUEDUCT.—EXCAVATION OF THE TUNNEL THROUGH SOFT GROUND.*

By J. P. Carson.

It was at first contemplated to construct the new Croton aqueduct, which is now furnishing the water supply for New York City, in an open cut, but investigations showed that the deep cuttings required would cost as much as a tunnel. This fact and the more permanent character of the work caused the tunnel to be adopted. After much deliberation the location of the present line was determined upon, commencing at Croton dam and running down the Saw Mill valley to High Bridge.

The rocks constituting the formation of the country through which the tunnel passed were metamorphic, principally gneiss, which varies from granite to ordinary mica schist. The first 14 miles from Croton dam to the crossing of Saw Mill river was through this material, and it constitutes about 90% of all the rock passed through to the Harlem river.

At the Saw Mill river a mass of siliceous dolomitic limestone was for the first time encountered. Near the surface it was decomposed, but gradually became harder, and with an occasional small pot-hole or clay-seam, continued quite regularly for 4,200 feet. It then gradually became decomposed (260 feet) and finally the soft ground of shaft No. 13 south heading was reached. This extended practically for 110 feet, and the driving of the tunnel through it caused more anxiety, trouble and expense, than any other similar work in this country. The predominant material was a hard, compressed, yellow mud, composed of fine particles of mica, sand and clay. Through the mass there were vugs of white and yellow clay, and several strong, water-bearing seams, filled with white sand and gravel. The water from these seams, when they were cut, formed with the mud a sticky mixture of the consistency of pea-soup. This mixture, being strained or allowed to settle, gave a sandy residue, upon which one could stand without sinking. A lump of the mud readily dried and hardened in the open air, but dissolved immediately in water. It was equivalent to a quicksand.



Station 778 + 45
Scale; ½ in. = 1 foot

Fig. 2.

The tunnel at the foot of shaft 13 was commenced on June 1st, 1885, and was driven southward at the rate of 80 feet per month for 392 feet, through dolomitic limestone, which then became softer. Fifteen feet further, at station 777 + 59, on the east side of the heading, a fissure was cut on December 9th, and the trouble began. There poured out a mixture of decomposed limestone, clay, sand and dirty water, which soon partially filled the tunnel for 125 feet, and amounted to about 100 cubic yards. After three days the water became clear, the fissure was plugged with straw, and the heading advanced 20 feet further. Then, on December 22d, without warning, another outpour three times greater than the first occurred. The men were driven out, and everything in the heading for 50 feet was covered out of sight.

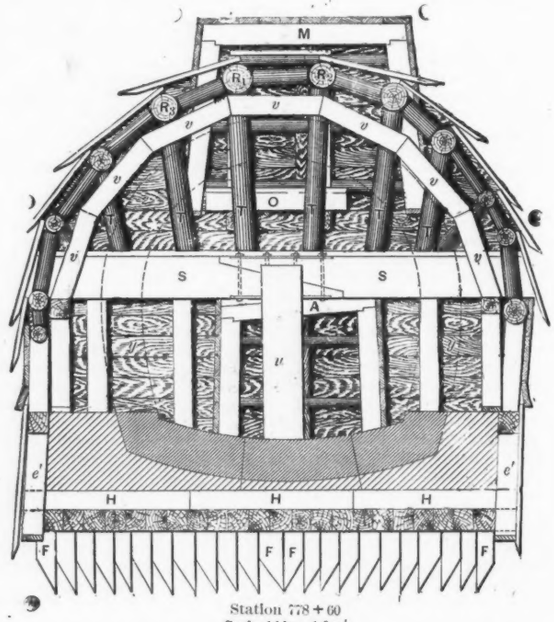
Timbering of the form shown in Fig. 1, allowing for 20-inch brickwork, was then commenced at the soft rock. At the end of two months the heading had been cautiously advanced 34 feet, to 778 + 13, and 17 sets of timber placed, the last two being reinforced with heavy hemlock spreaders. A bulkhead was then built at the end of the timbers, at 778 + 09, this being the edge of the soft ground on the east side. The bench during this time had been brought up, and was 32 feet behind, at 777 + 77.

For several days the clay and mud in the face of the heading were continually forced inwards. Some idea of the pressure may be formed from the fact that the 24-inch oak logs used as rakers at the bulkhead became so crushed after twenty-four hours that they had to be continually renewed. A small cave on the surface then occurred; finally, on February 20th, this was followed by a much larger one, about 25 feet east of the center-line. It was directly in line of a small stream which partly filled it with water. This cave was supposed to be the mouth of the original fissure, and an abortive attempt was made to clog it up by throwing in bales of hay, cedar-brush, logs and stumps, the stream having been diverted. Either from the fact that the course of the brook had not been properly diverted, or by reason of a sudden thaw, or local conditions, this débris gently glided down into the tunnel, completely filling it for 70 feet, and gradually sloping down to a depth of 1·5 feet for 312 feet, or to within 75 feet of the foot of the shaft. It amounted to about 1,189 cubic yards.

Acting upon the theory of a fissure in the limestone the plan of sinking a crib was adopted with the idea of striking the fissure, which was to be arched over, or otherwise closed. The dimensions of the crib were 12 × 12 feet on the outside. It was built in the hole, and consisted of wall plates of 12-inch timber jointed at the ends, and held apart by vertical posts, 2 feet 10 inches long, placed at the corners, the whole system being held together by planks spiked on the outside. It was sunk to a depth of 50 feet, when, hard-pan occurring on the west side, it began to sink irregularly. Sheet piling was then driven on the east side, and finally, to keep the crib from toppling over, ropes were attached to the top and bottom sets, and secured to trees and posts on the surface.

After three weeks' work and the expenditure of about $900 the contractors concluded that they had expended the amount allowed "for any work they should do on the surface, to be paid after the tunnel was through," and stopped.

At this time several plans were proposed. Among the most feasible were the following: Mr. Charles M. Kalmback, a well-known tunnel-expert, proposed to drive a heading below sub-grade and fill with concrete; then gradually to widen out; and thus obtain a foundation. The division engineer in charge, Mr. Alfred Craven, proposed instead, a timber platform of oak or Georgia pine, upon which the concrete should be laid, and to change the section from the horseshoe to the circle. This was generally conceded to be right, but in the following August it was decided to use white oak for the platform, and return to the horseshoe-section; and this plan was formally approved January 10th, 1887, but not fully adopted by the contractors until the year after. The functions of the engineers were confined to giving lines and grades, and suggesting plans to the contractors, who executed the details of the work in their own way, and assumed the responsibility of any miscarriage.



Station 778 + 60
Scale; ½ in. = 1 foot

Fig. 4.

For the next year the work was carried on with a series of experimental drifts, conforming to no regular system of timbering, and the means adopted were entirely inadequate to the work in hand. The great trouble was to drain this ground. The water amounted to 160 gallons per minute. After ten months it had not sensibly diminished, and, in fact, it never did diminish.

Finally, in March, 1887, there occurred a complete change in management; Mr. Nolan was appointed foreman in charge, the English system was introduced, and the work completed without serious interruption in a year and two months.

The entire excavation made was allowed within the limit of 676 square feet, or 26 × 26 feet. This permitted the placing of a 2-foot timber platform and 24 inches of brick masonry. The average area excavated was 507·7 square feet.

The first two stretches of 13 and 12 feet occupied respectively 20 and 12 weeks. Against advice, a top-central drift was first run about 18 feet, and, as the rock was found on the west side, the widening was done from west to east; about 15 crown-bars were placed, and a bulkhead built. The bench was then removed to 4·2 feet below grade. A platform 2 feet thick, formed of cross and longitudinal timbers 12 × 12 inches was built. Upon this the invert was laid, and the masonry completed.

In widening out the second stretch, several of the crown-bars on the east side broke, and the weight of the ends resting on the masonry arch at + 18 caused it to crack for 8 feet. This crack extended irregularly down the east haunch and side-wall. The difficulty was overcome by supporting the arch with oak centering, and also by placing a large 24-inch longitudinal timber in the center, supported by posts about 6 feet long from the invert and mud-sills. From this, radial pieces were placed

*From a paper read before the American Institute of Mining Engineers, New York, September, 1890.

to the crown-bars above. Finally, the bottom was removed and platform placed. The cracked portion of the arch was subsequently rebuilt.

Top-drifts were still persisted in, both here and in the heading from shaft 13 A, (Sta. 779+96, commenced December 4th, 1886) which had now reached the other end of the soft ground; but after two weeks' further trial the foreman was finally forced by the mud, sand and water to abandon them.

As above mentioned, the English system was finally adopted, and the following is a description of its application: The beginning was made 4 feet north of the soft ground. The first 54 feet were worked from the top, down; the remaining 60 feet from the bottom up.

Referring to shaft 13: on January 28th, 1888, the excavation and masonry had reached 778+45, and a small preliminary bottom drift, 2 feet by 3 feet, was driven through, connecting both headings, and the top drift from the driving of the previous section, was at station 778+55.

The First Operation.—The lower drift was enlarged to 6 feet by 8 feet for a distance of 25 feet. (*A*, Fig. 2.)

The Second Operation.—Widening out of the drift. Bearing-bars, *B* (Fig. 2), 20 feet long, were placed under the caps, and supported by posts, resting on longitudinal sills, *bb*. The operation of widening out, on either side as most convenient, was then done, and the bars, posts and sills (*c*, *c*, *c*, *d*, *d*, *d* and *e*, *e*, *e*) placed. The process of widening is shown on the left of the drawing, Fig. 2.

The Third Operation.—The placing of the timber platform. The previous operation being well advanced or completed, sheet-piling was driven down, five or six feet outside of the sills *b*, *b*, *e*, *e*, etc., and the inclosed spaces were excavated in pockets to a depth of 4·5 feet below invert-grade, for a length of 18 feet, and as wide as possible, generally 10 or 15 feet. Posts *b'*, *e'*, etc, placed at intervals measuring seven feet, Figs. 2 and 3, resting on foot-boards in the mud, now support the system. Sheet piling, *F* (Fig. 3), three or four feet long, was then driven across the bottom of the excavation about 15 feet in advance of the completed invert. This prevented the mud from being pumped out from beneath the platform during the construction of the succeeding section. The longitudinal sills, *G*, in variable lengths up to 15 feet, were then placed in the excavated spaces between the posts, *b'*, *b'*, *b'*, *e'*, etc. Underpinning was then employed in order to get the longitudinal sill in the space interrupted by the line of posts. Immediately behind the first post, a cross-sill, *H* (Fig. 2) 6 feet long was placed on blocks 6 inches above the sills in place. The weight was transferred to this and the first post removed. The second post was removed in a similar way. The third post was supported by struts, *X* (Figs. 2 and 3). The sill, *G*, in the vacant space was in half-lengths and was slipped into place, as shown in Fig. 3. The cross-sills, *H*, were then placed. The sills put in were as long as circumstances would allow, and arranged to break joints. The posts, *e'* (Fig. 4), on the outside, could seldom be removed; and longitudinal pieces were placed between them. The excavated space ahead of the platform was used as a sump for pumping.

The Fourth Operation.—The platform being completed, the cross-beams, *J* (Fig. 5), supported by the inclined posts, *k*, *k*, were placed about

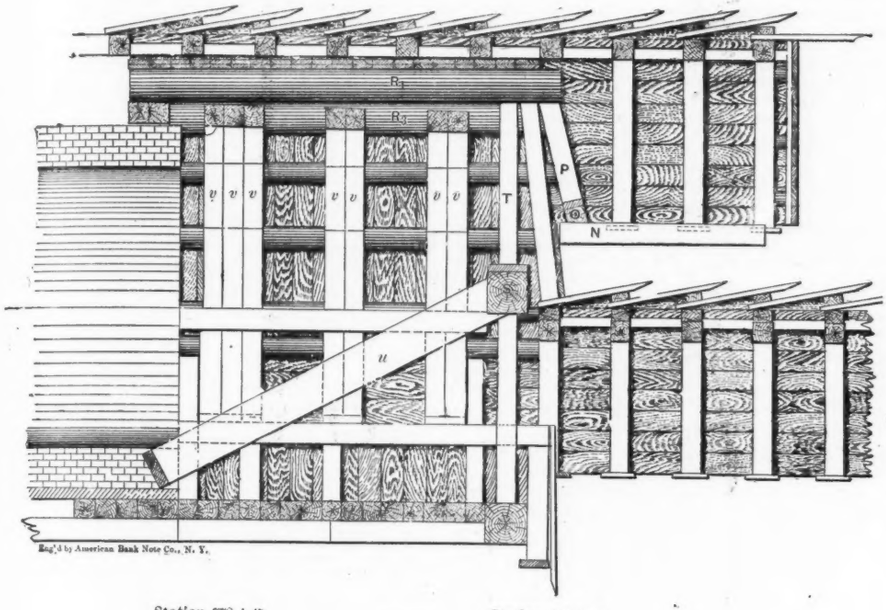


FIG. 6.

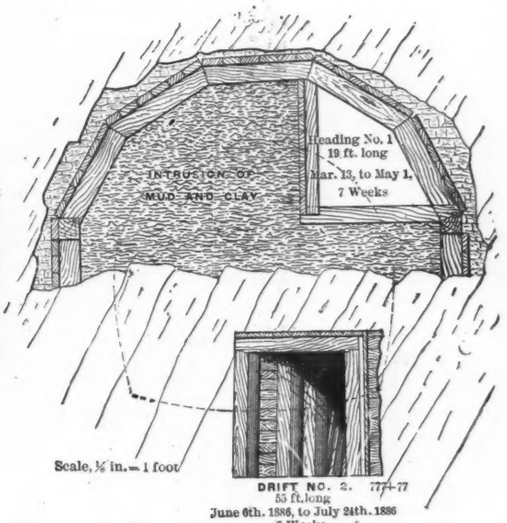


FIG. 1.

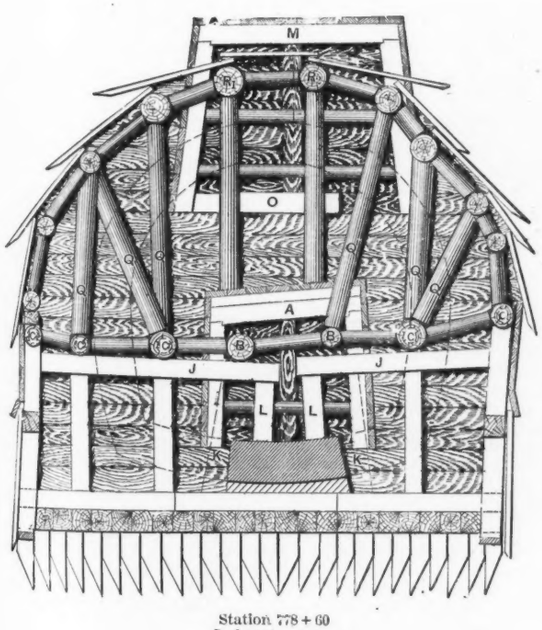


FIG. 5.

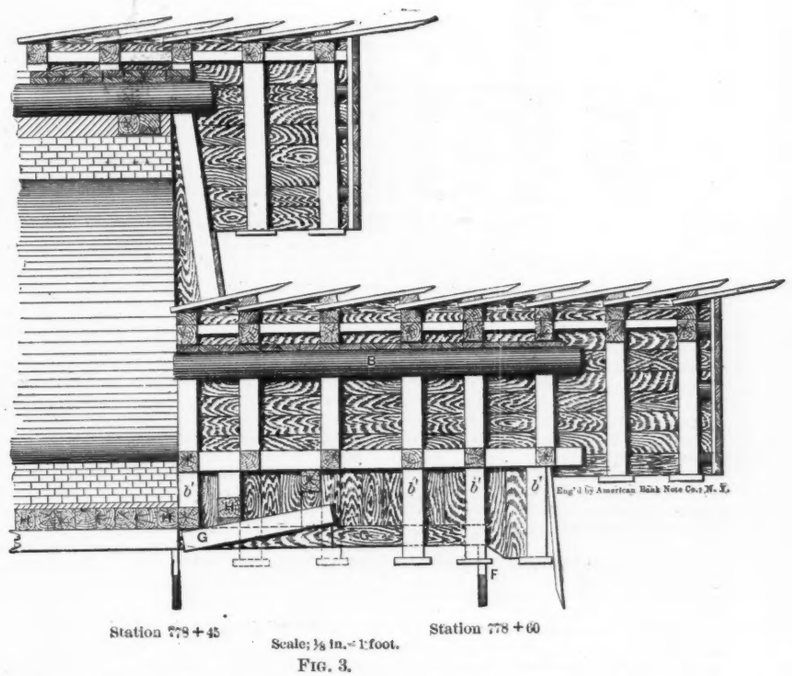


FIG. 3.

three feet between centers under the bearing-bars, *B* and *C*, and well wedged up. The posts and sills, *b*, *b*, *d*, *e*, and *e'* were removed, and the central portion of the invert built between *K K*, which were replaced by *L L* (Fig. 5), and the remainder of the invert and two feet of side-wall and backing was built (Fig. 4).

While the masonry was being built, the top-heading, *M* (Fig. 5), was advanced 15 feet to + 70.

The Fifth Operation.—The crown-bars, R_1 R_2, etc. (Figs. 5 and 4), were placed. The back ends rested on the arch already built, and the heading-ends of the first two were supported by the posts, *P* (Fig. 6), resting on the cross-sill, *O*, and two longitudinal sills, *N*, placed in the top heading (Figs. 5, 4 and 6). The excavation was carried down and out at the same time, and the other bars were supported by the struts, *Q*, resting on the bearing-bars, *B*, *C*, etc. (Fig. 5). The large beam, *S* (Figs. 4 and 6), 24 inches by 24 inches, 26 feet long, was then placed ahead of the invert, and supported by posts resting on sills in the bottom, and strutted back to the invert by the rakers, *u*. Posts, *T*, were placed under the crown-bars and set upon this sill, which also served as a bearing for the bulkhead against the mud in the face. When the section was completed, the sill was cut off and removed, the ends being built in. To support and strengthen the crown-bars, the segmental timbers, *v*, supported by posts resting on foot-blocks on the masonry already built, were put in, one or two feet apart as necessary. The sidewalls and the arch were finally constructed. No attempt was made to withdraw the crown-bars.

This was the general order of operations which were varied in their successive stages according to circumstances.

There is no published record of a tunnel foundation having been built as described above. At first some difficulty was caused by carelessly removing the sheeting in front of the invert and allowing some of the material beneath to be pumped out, thus undermining it. Some of the crown-bars on the east side were broken; and some placed too low. They were cut out and replaced by segmental arches of oak, and finally these arches were always used to relieve the weight of the crown-bars on the brick arch; and as a precautionary measure, the last five stretches, one of them in 13 A, were built in this manner. The heading being opened through to 13 A for four months, obviously drained and facilitated the latter portion of the work.

The last stretch was finished June 1, 1888. According to a most liberal estimate, including the cost of sinking shaft 13 A, the cost for 110 feet was at the rate of $416.00 per foot. The amount paid for this work was at the rate of $539.00 per foot.

THE GRANITE INDUSTRY OF THE UNITED STATES.*

By William C. Day.

The term "granite" is here used in its commercial rather than in its scientific sense. At the same time it is true that the great bulk of the granite herein reported is true granite of one subvariety or another.

According to the report of the tenth census, the production of granite in 1880 was valued at $5,188,998; in 1889, in the same states, it was $13,557,686. The increase was, therefore, $8,368,688, or 161%. The figures for 1880 did not include the production of granite from quarries whose output was less than $1,000 in the census year. That this does not affect the comparison greatly, however, may be seen from the fact that in 1889, the output of quarries, the value of which in each case did not exceed $1,000, amounted to only $28,147.

The full details of the status of the granite industry in the United States in 1889 are set forth in the accompanying table.

Uses.—The value per thousand of paving blocks is found to vary from $32.32 in Wisconsin to $78.67 in Delaware. In the most important states which produce paving blocks, namely, California, Maine, Massachusetts, Missouri, New Jersey and Pennsylvania the value varies from $40 to something over $60 per thousand. The variation in the price in these states, in all of which the production of paving blocks has been going on for some time, is due to the quality of the stone used for these purposes, and also to the special care observed in trimming blocks to certain definite sizes. In some localities surface rock of inferior quality is broken up into paving blocks, which are sold at low prices.

Considering cemetery purposes, a very wide variation in price exists, ranging all the way from 14 cents a cubic foot in New York, where comparatively little of such work is done, to $6.79 in Wisconsin, where also very little, indeed, was done, amounting perhaps to only two or three contracts; so that the reasons for these extremes in prices are at once apparent. In Rhode Island the average price reaches the high figure of $5.33 per cubic foot, which results from the fact that most of the stone used for these purposes in Rhode Island comes from Westerly, and is unusually well adapted for such work; and, further, the ornamentation and finish put upon the Westerly granite are of a very high order.

The value per unit of the product used for bridge, dam, and railroad work is naturally low, although it shows considerable variation.

Comparing the grand totals for the various purposes, it appears that of the entire output of the country $6,000,000 worth, or something less than half, is devoted to building purposes, and a little less than one-third to street work, of which more than half is the value of paving blocks. The value of the stone devoted to cemetery, monumental, and decorative purposes is about one-sixth of the entire amount, but its value per cubic foot, namely $1.13, is naturally vastly in excess of the value per unit of the stone used for any other purpose. Something less than one-tenth of the value of the output is devoted to bridge, dam, and railroad work, while the value for miscellaneous uses is quite small.

Comparing the various states, it appears that for building purposes the value in the product in Massachusetts is decidedly in advance of that for any other state, Maine standing second, Connecticut third and California fourth. In street work, Maine is largely in the lead, California tak-

PRODUCTION AND CONSUMPTION OF GRANITE IN THE UNITED STATES IN 1889.

STATES	No. Quarries.	PRODUCT. Cu. ft.	Value.	Val. per cubic ft.	EXPENSES. Total No. Emp'y'd	Wages.	Total.	CAPITAL INVESTED. In land.	Total.	Cost per cubic foot.	% of wages to total expenses	Wages per cubic foot.	PRINCIPAL USES. (b) Building Purposes. Cu. ft.	Value.	Street Work. Cu.ft. (c)	Value(c)	Monumental and Decorative. Cu. ft.	Value.	Bridge, Dam and Railroad Work. Cu. ft.	Value.
Total..	874	62,287,156	$14,464,095	$0.23	22,313	$9,620,485	$11,504,021	$10,897,417	$19,115,449	$0.18	83·63	$0.15	26,147,338	$6,166,034	20,683,221	$4,456,891	2,106,953	$2,371,911	12,207,244	$1,238,461
Cal.	76	4,761,411	1,329,018	0.28	1,803	809,205	973,276	1,926,095	2,829,791	0.20	83 14	0.17	496,352	419,816	3,284,232	551,613	85.927	115,114	879,900	237,475
Colo.	10	2,677,465	314,673	0.12	213	192,700	214,180	255,350	315,485	0.08	89·97	0.07	2,620,419	294,356	1,100	230	55,946	20,087	.....	.....
Conn.	53	3,835,704	1,061,202	0.28	1,630	697,080	813,200	348,600	891,889	0 21	85·72	0.18	2,358,286	758,915	567,860	109,261	148,108	111,155	571,031	65,659
Del.	5	1,886,431	211,194	0.15	253	116,216	191,662	13,200	104,545	0.14	60·54	0.08	229,056	32,443	155,500	67,202	.....	.....	995,382	110,849
Ga.	28	2,425,622	752,481	0.31	1,367	396,461	472,107	1,267,474	1,481,622	0.19	83·98	0.16	700,939	347,146	658,673	250,634	189,655	47,997	876,425	106,750
Maine.	153	6,701,346	2,225,839	0 33	3,737	1,517,026	1,823,976	1,377,735	3,192,317	0.27	83·17	0.23	1,819,711	839,125	5,736,541	927,949	231 972	299,158	856,786	145,117
Md.	23	3,371,032	447,489	0.13	846	275,566	351,909	386,850	640,448	0.10	78 31	0.08	1.578,872	263,491	1,051,010	125,958	31,100	19,410	710,050	38,630
Mass.	151	9,587,996	2.503,503	0.26	3,333	1,630,128	1,973,729	1,099,563	2,235,759	0.21	82·39	0.17	6,643,703	1,362,451	1,475 093	466,147	509.087	497,438	252,288	33,040
Minn.	23	558,200	356.782	0.64	558	276,859	295,007	142,627	294,218	0.53	93·85	0.50	211,548	209,356	338,640	141,554	5,312	4,277	2,700	1,555
Mo.	10	1.264,317	500,642	0.40	617	349.208	425,667	460,500	593,100	0.34	82·04	0.28	110,468	219,518	871,209	216,986	123	500	282,520	63,638
N. H.	78	2,822,026	727,531	0.26	1,253	529,945	597,491	366,106	761,362	0.21	88·70	0.19	1,303,331	324.567	1,157 992	252,256	151,711	135,029	110,467	8,409
N. J.	23	6,374,575	425,673	0.07	627	294,284	330,544	115,700	418,850	0.05	89·09	0 05	324.150	42.175	2,089,796	236,310	250	125	3,960,379	147,063
N. Y.	13	1,515,511	222,773	0.15	401	182,831	217,160	288,300	422,700	0.14	84·19	0.12	1,078,203.	149.700	247,902	51,062	121,906	17.261	67,500	4,750
N. C.	22	708,267	146,627	0.21	391	101,134	123,937	120,777	255,130	0 17	81 60	0.14	6:,697	33,327	521,820	42,605	25,106	23,345	378,500	44,240
Ore.	4	287,400	44,150	0.15	54	29,86)	37,033	48,000	60,600	0.13	86·63	0.10	63,000	6,300	117,400	30,200	2,000	2.350	105.000	5,300
Penn.	64	5,782.887	623,252	0.11	1,207	441.231	516,923	525,178	930,409	0.09	85·36	0.08	2,379,875	143 221	1,996,486	368,323	15,050	5.725	1,383,976	101,473
R. I.	37	2,878,237	931,216	0.32	1,195	618.013	789,219	279,770	646,392	0.27	78·31	0.21	2,349,711	266,400	213 477	65,817	110.310	588,199	204.739	10,800
S. C.	9	214.479	47,614	0.22	99	22,843	35,028	90,634	143,275	0.16	65·21	0.11	25,777	8.130	94.489	34,016	4.213	2,528	90,060	2,940
S. D.	3	786.120	304,673	0.39	408	216.773	222,229	288,200	444,566	0 28	97·54	0.28	185,120	133.978	601,000	176,695	.....	.....	.....	.....
Texas.	8	20,400	22.550	1.11	64	20,464	33,738	184,000	212,125	1.65	60·66	1.00	19,700	21,000	.....	.....	700	1,550	.....	.....
Utah.	3	123,500	8,700	0.07	18	7.695	7,846	8.000	18,750	0.06	98 09	0.06	122,900	8,310	.....	.....	600	390	.....	.....
Vt.	53	1,073,936	581,870	0.54	961	408 916	477,114	683,164	967,750	0.44	85·71	0.38	236,759	45.198	221,128	48,393	373,020	412,287	197,834	41,713
Va.	13	1.703,206	332,548	0.20	716	218,828	256 125	234,900	446,650	0.15	85·44	0.13	1,080,873	120,467	286,946	75,925	44.620	66,356	281,167	69,000
Wis.	8	1.385,600	266,095	0.19	478	221.493	261,791	144,700	546,413	0.19	84·61	0.16	100,360	40,640	1.285,000	223,825	240	1,620	.....	.....
Other States (a)	4	41,488	76,000	.....	84	45,725	63,030	242,000	261,300	.....	.....	.....	41,488	76,000	.....	.....	.....	.....	.....	.....

(a) The states here grouped, in order that the business of individual establishments may not be disclosed, are Arkansas, Montana, Nevada, and Washington.
(b) The balance of the amount of granite produced was used for miscellaneous purposes, not classified.
(c) Including paving blocks, of which there were used 61,822,871, valued at $2,978,172.

ing second place, while Massachusetts, which for total production heads the whole list, stands third. In connection with cemetery and monumental work, it is interesting to notice that Rhode Island stands at the head of the list, the value of its output amounting to nearly $600,000, Massachusetts coming second and Vermont third. In Massachusetts and Vermont the leading localities producing fine ornamental work are Quincy, in Massachusetts, and Barre, in Vermont. In the latter locality production, although carried on to a limited extent in 1880, has largely developed within the past ten years. In value of granite devoted to bridge, dam and railroad work California stands first, New Jersey second, Maine third, Delaware fourth and Georgia fifth.

Labor.—Considering the daily wages paid to foremen, it is noticeable that among those states in which the granite industry has long been prosecuted the average is fairly constant, varying from $3 in Virginia to $3.41 in New Hampshire. In the western states the average is markedly higher, being $4.34 in California, $3.67 in Minnesota, and $4.34 in Wisconsin. The foremen employed in western states naturally come in great part from the old-established quarry regions of the east, and their services, therefore, command a higher figure in these comparatively undeveloped regions. This statement, together with the fact of increased cost of living, accounts for the higher wages paid in these states. Very much the same condition is found to exist with the other classes of labor, quarrymen, for example, in California receiving $2.38; in Colorado, $2.50, and in Utah $3. In the older granite-producing states wages for quarrymen amount to about $1.75 per day, but in the southern states the amount is invariably less. In connection with mechanics, the figures show that the number in Maine is almost twice as great as that in Massachusetts. This great difference has been found to be due to the respective methods of classification of mechanics in these two states. In Maine it is a common practice to include stonecutters among mechanics, whereas in Massachusetts engineers, blacksmiths, and the like make up the number of mechanics. It is interesting to note in this connection that the average value per cubic foot of the total output in Maine is 33 cents, while for Massachusetts it is 26 cents; in other words, a greater output of finished product in Maine than in Massachusetts is indicated, and therefore, this serves to explain the greater number of mechanics in the former than in the latter state. Wages for laborers in most of the states

* Abstract of a Census Bulletin.

are not far from $1.50 per day, although low figures are noticeable for the southern states. The highest figures paid are in the western states, as, for example, $2.11 in California and $1.96 in Colorado. In regard to the number of boys under 16 years of age employed in connection with the granite industry, it is noted that Maine employs nearly twice as many as Massachusetts. The total number, however, for the whole United States is only 343. As an explanation of this, it may be stated that in Maine there are a great many small quarries operated by farmers. After the farm work is practically done for the year, attention is devoted to the development of such quarry property as may be included in these farms. Maine and Georgia together employ 104 boys, or nearly one-third of the total number employed in the United States. The wages paid to boys vary considerably, being less than $1 per day, although in a few cases this amount is exceeded.

The cost per cubic foot of the total product shows a decided variation, as would, of course, be expected from the complexity of the causes involved, such as ease or difficulty of quarrying, quality of stone, transportation facilities, cost of labor and the great variation in the amount of manufacturing done upon the rough product. In the matter of the proportion which wages bear to the total expense of production, it will be seen that in nearly all cases this is above 80%, and in a few cases it constitutes almost the entire item of expense. In regard to the amount of wages paid per cubic foot, it should be borne in mind that these wages include all paid on the product up to the time it was sold by the producer, and inasmuch as it has been sold in all stages of finish, there is a correspondingly great variation in the wages paid per unit. Excessively high figures were paid in several western states in which production is just beginning, and in each of which there are only a very few operators. In the matter of ratio of wages to total value, the figures for the various states, except in those states where actual loss occurred, do not show a very great variation.

PROMINENT MEN IN THE MINING INDUSTRY.

Charles T. Limberg.

Mr. Charles T. Limberg, whose portrait we present this week, was one of the pioneers who went to Leadville in 1878, and is a man well known in mining circles throughout the west, having been prominently connected with the silver-lead smelting industry for many years.

Mr. Limberg was born in St. Louis, Mo., in 1853, being of German descent. He received his education in Germany, and upon his return to the United States entered the banking business in St. Louis, passing through all grades to the position of assistant cashier. He then entered the employ of the Vulcan Iron Works, of St. Louis, and remained with this company until it closed down its works in 1877.

In April, 1877, Mr. Limberg went to Leadville, Colo., to accept a position as secretary of the A. R. Meyer Ore Milling and Sampling Company, which was one of the first ore-buying concerns of the Carbonate Camp. He purchased an interest in this company, and later became its vice-president.

Mr. Limberg was successful in this venture, and in 1882, in connection with Mr. A. R. Meyer, organized the Arkansas Valley Smelting Company by consolidating the A. R. Meyer Ore Milling and Sampling Company with the smelting works of Messrs. Billings and Eilers. Mr. Limberg was placed in charge of the new company as its general manager, and retained that position until December, 1890, when he retired, having sold his interest in the company to the Consolidated Kansas City Smelting and Refining Company in the January preceding.

Mr. Limberg has extensive ranching interests in the western part of Colorado, and for many years has been engaged in mining operations, principally in the vicinity of Leadville. Since his withdrawal from the Arkansas Valley Smelting Company he has been engaged with his mining and other personal interests exclusively. He was one of the projectors of, and is a shareholder in, the Elk Mining Company, which acquired a portion of the property of the Morning Star Consolidated Mining Company by lease, and has opened the continuation of the Star ore chute southwest of the Carbonate fault, within the city limits of Leadville, an undertaking which has met with much success, this company now being one of the largest producers of Leadville.

As general manager of the Arkansas Valley Smelting Company, Mr. Limberg displayed business talent of high order, and during the eight years in which he conducted its operations was remarkably successful considering the extremely unfavorable conditions under which smelting was carried on in Leadville during the latter portion of his term of office. He increased and improved the smelting plant of the company, and made it the largest and best arranged of any in the Leadville district.

Mr. Limberg has achieved his success in the mining and smelting industry through his own energetic efforts alone. He is a man of great enterprise and excellent business judgment. He is generally liked on account of his genial disposition and warm heart, has a host of friends, and is extremely popular in Leadville and throughout Colorado.

CHARLES T. LIMBERG.

DETERMINATION OF SMALL AMOUNTS OF ALUMINUM IN CAST-IRON AND STEEL.*

By Adolphe Carnot.

A rather large quantity of the metal to be determined is taken, for instance 10 grammes, and is treated with hydrochloric acid in a platinum capsule. The use of glass or porcelain is avoided as much as possible to prevent any accidental introduction of alumina from the apparatus.

When the metal is entirely dissolved, without allowing the solution to become peroxidised by exposure to the air, it is diluted with distilled water and put into a flask or a beaker, washing it several times by decantation, and retaining the insoluble portion—graphite, silica, etc.—upon a filter. A portion of silica may remain in solution, and must be eliminated afterwards; this must not be done by evaporating the solution to dryness, however, as it contains an enormous quantity of ferrous salt.

The greater part of the free acid is neutralized with ammonia and then with sodium carbonate, and sodium thiosulphate is added. When the violet coloration has entirely disappeared, and there is no more ferric salt in the solution, which is now completely colorless, 2 or 3 cc. of a saturated solution of sodium phosphate and about 20 cc. of a solution of sodium acetate is added. The liquid is then heated to boiling, which is kept up for about forty-five minutes, as long as the slightest odor of sulphurous acid is perceived.

There is formed a precipitate, generally of little bulk, consisting of aluminum phosphate mixed with sulphur, and containing a little silica and ferric phosphate. This precipitate is received on a filter, and washed with a little boiling water, and then placed on a capsule of platinum, and treated in heat with 10 or 15 cc. of hydrochloric acid diluted with water.

The solution is evaporated to dryness, and the residue is kept at 100° for an hour, so that the silica may become perfectly insoluble in acids. It is then re-dissolved in a little dilute hydrochloric acid, heat being applied to re-dissolve all the aluminum and iron phosphate; the liquid is filtered to remove the last traces of silica, diluted with 100 cc. of cold water, and the precipitation of the aluminum phosphate is repeated by the same method—that is, by almost complete neutralization of the acid with sodium carbonate, the addition of thiosulphate in the cold, and subsequently of a mixture (previously dissolved) of 2 grammes acetate and 2 grammes thiosulphate, boiling for half an hour, and filtration through a small filter of paper, which has been washed with acids and leaves no ash.

The silica and the small quantity of iron which remained in the first precipitate have thus been completely eliminated from the second, which, after having been washed with boiling water, is dried, ignited, and weighed.

The aluminum phosphate thus obtained ($Po_5Al_2O_5$) contains 22.45 per cent of aluminum. The operation requires only a few hours, and gives accurate results.

* *Bull. de la Soc. Chim. de Paris*, Vol. v No. 3, p. 139.

OFFICIAL REPORTS.

Rio Tinto Company, Limited.

The following is an abstract of the eighteenth annual report of the Rio Tinto Company, presented at the general meeting of the shareholders, April 17th. The company produced during the year 1,261,754 tons of pyrites, with an average copper content of 2·883%. Of this quantity 396,349 tons were selected for shipment and 865,405 tons for local treatment. There were invoiced to consumers in the United Kingdom, Germany, France, and the United States 397,875 tons. The contracts made for sale of pyrites in 1891, 1892, and 1893 are at some reduction in the price of sulphur, but for a larger quantity.

The copper produced at the mines, during the year, was equal to 19,183 tons of 20 cwt. The quantity of copper brought to market was: Refined, 19,997 tons; in pyrites, 9,592 tons; total, 29,589 tons. The quantity of copper carried over at cost price was 5,848 tons, and the quantity of copper in the reserve heaps at the end of the year was 92,551 tons, which stood at a cost of £6 2s. 7d. per ton of copper.

The profits on the sales of produce including £152,787 10s 9d., the balance brought forward, amounted to £1,045,0?3 4s. 6d. After providing for the mortgage redemption and interest, expenses of administration, taxes, and sundry other items, there remained a net profit available for dividends of £694,005 19s. 9d. The interim dividend of 15s. per share paid in November, 1890, absorbed £243,750; and a final dividend, now declared, £292,500, making together 33s. per share, or 16½% on the capital stock. A balance of £157,755 19s. 9d. is carried forward.

The actions against the *Société des Métaux* for non-fulfillment of contract were continued during the year in the English and French courts. The former have given judgment in favor of the company, but the French Court of Appeal has not admitted the claim. The advisability of appealing to the Court of Cassation, the final court of appeal in France, to enforce there the judgments obtained in England, is now being considered. The action against the "*Comptoir d'Escompte*," under its guarantee of the agreement with the *Société des Métaux*, has been discontinued.

As the Spanish government has suspended the royal decree of 1888, which had for its object the abolition of the calcination of pyrites in the open air, the company has been enabled to continue open-air calcination, which by the decree referred to was to have been entirely discontinued as from January 1st, 1891.

The following table shows the production of the Rio Tinto Company from 1876:

	Pyrites extracted.				Pyrites consumed.		Copper produced at mines.
	For shipment.	For local treatment.	Total.	Average copper contents.	Tons.	Average copper contents.	Tons.
1876....	189,962	159,196	349,158	1·5%	158,597	1·5%	946
1877....	251,360	520.391	771,751	2·375	211,487	2·	2,495
1878....	218,818	652,289	871,107	2·78	211,403	2·18	4,184
1879 ..	243,241	663,359	906.600	2·78	236,849	2·45	7,179
1880....	277,590	637,567	915,157	2·365	274,210	2·481	8,559
1881....	249,098	743,949	993,047	2·75	256,827	2·347	9,466
1882 ..	259,924	688,307	948,231	2·805	272,826	2·401	9.740
1883....	313,291	786,682	1,099,973	2·956	288,104	2·387	12,295
1884....	312,028	1,057,890	1,369,918	3·234	314,751	2·241	12,668
1885 ..	406,772	944,694	1,351,466	3·102	354,501	2·270	14,593
1886....	336,548	1,041,853	1,378,381	3·043	347,024	2·306	15,863
1887....	362,796	819,642	1,182 438	3·047	385,842	2·283	17,813
1888 ..	434,316	969,317	1,403,633	2·949	393,149	2·208	18,522
1889 ..	389,943	824,380	1,214,323	2·854	395.081	2·595	18,708
1890 ...	396,349	865,405	1,261 754	2·883	397,875	2·595	19,183

The dividends for the past eight years have been at the following rates: 1883, 14%; 1884, 8%; 1885, 5½%; 1886, 3%; 1887, 10%; 1888, 17%; 1889, 10%; 1890, 16½%.

ASBESTOS MINING IN QUEBEC.*

By R. W. Ells.

The asbestos mines of the province of Quebec are, at the present day, of special interest to the mining and industrial world, from the fact that in so far as now known they practically represent the only deposits where this mineral, of a quality adapted for spinning, and for the finer purposes of manufacture, can be profitably obtained.

The rocks with which the asbestos veins are associated in Quebec constitute a somewhat distinct series, which have, for the last thirty years, been known under the name of the "Quebec" group. They comprise an extensive and important development of both sedimentary and eruptive rocks, which extend throughout the eastern part of the province, from the Vermont boundary to the extremity of Gaspé peninsula. They are not recognized in their entirety in any other part of Canada, though certain portions of the group are found in their extension southward into the United States. Crossing the Gulf of St. Lawrence they, however, form a very extensive belt in the island of Newfoundland, where, more particularly at certain points on the west coast, the same series of slates, sandstones, diorites and serpentines occur, the whole presenting features both from geological and mineralogical standpoints, very similar to what are seen in this portion of Canada. While these rocks in Newfoundland have, to a certain extent, been traced out, no systematic search for asbestos has as yet been made, though that the mineral occurs there at a number of points, and in a variety of forms, is clearly indicated by the specimens which have from time to time been obtained in the course of the general geological exploration of the Island. Some of these specimens belong to the group of actinolitic minerals like the deposits found in Potton and Bolton, but among others observed from that country were samples of vein asbestos, equalling in quality any obtained at Thetford, and having a fibre from two to three inches in length.

The mineral asbestos proper belongs to the hornblende or pyroxene group of minerals, while that of Quebec, commonly known by this name, is in reality a variety of serpentine, mineralogically known as chrysotile. It is found in the eastern townships of Quebec, in small veins occurring in masses of serpentine which form a series of disconnected masses, generally of small extent, surrounded by igneous rock, principally dioritic, but occasionally rising through great outcrops of slates or schists. Sometimes, however, these masses of serpentine assume such proportions as to rank almost as mountain ridges.

Prior to 1880, the greater part of the fine asbestos fibre adapted for spinning came from the mines of Italy and Corsica, and owing to the difficulty with which it was obtained, and its exceptionally fine quality, commanded a very high price in the market, reaching as much as $250 to $300 per ton: but the discovery of the chrysotile deposits in the Province of Quebec, of a quality equally well adapted for spinning as that of Italy, taken in connection with the fact that these were situated directly along a line of railway within short haulage of a shipping port, almost revolutionized the industry, and has lately nearly closed the Italian mines.

Much of the so-called asbestos of these mines, however, is not adapted for spinning, and is used for the manufacture of mill-board, cements, paints, etc., as is also the output from such mines in the United States as have been working more or less constantly for the last twenty years. The output of the Quebec mines has even already had such an effect upon these that their present output is probably scarcely one-tenth of what it reached ten years ago.

In Ontario a large quantity of the mineral actinolite, a member of the hornblende family, is mined and ground at Bridgewater, in Hastings County. This is used for cement roofing, being mixed for that purpose with tar, the fibrous texture of the material being such as to allow of its felting, but not for spinning.

The serpentine of Quebec which is really asbestos-bearing to an extent which can be profitably worked, is confined to a comparatively limited area, and more particularly to certain portions of the townships of Thetford, Ireland, Coleraine and Wolfestown, in which localities successful mining operations have been carried on for some years. But even in these districts there are large portions of the serpentine belts which, in so far as yet proved, have disclosed no asbestos in quantity to be economically available. The rock carrying the merchantable asbestos is generally a greyish weathering serpentine of some shade of green on fresh fracture, generally a greyish green, in which are contained numerous small particles of iron, both magnetic and chromic, more generally the former. Serpentines that have a black, hard, chippy aspect do not apparently promise well, nor does the rock which weathers a dirty reddish brown. In the asbestos-bearing rock proper the veins of asbestos are seen, without any special arrangement, intersecting the mass of the rock generally in every direction, but for the most part at a considerable angle both to the perpendicular and horizontal. Certain peculiar arrangements of these veins are, however, noted in certain areas, as at the King Bros.' mine in Ireland, where the serpentine appears to be regularly stratified almost in the manner of sandstone or quartzite in layers dipping to the northwest, and the veins of asbestos apparently follow what, in sedimentary rocks, would be regarded as the bedding planes. In several other places the veins, few in number, cut the rock in an almost horizontal position, and when found in a knoll can be traced across from one side of the hill to the other nearly on the same plane, but as a rule the veins are irregularly placed. In size they range from mere threads up to a thickness of five or six inches, though the most of the workable veins in the principal mines do not, or but rarely, exceed two and a half inches in width or length of fiber, and such veins, where the asbestos is of good quality and unbroken by partings of iron, are regarded as extra No. 1 material. There are, however, generally more small veins of one inch or less than of the larger size. Serpentines associated with talc or with soapstone, where the latter is in quantity, rarely appear to carry veins of asbestos to any extent, and such steatitic rock is not usually considered good mining ground. The Broughton mine may possibly be cited as an exception to this principle, since at this place a vein of large size, of very fine fibre was found lying between serpentine and soapstone walls. As the soapstone became more abundant, however, the size of the vein rapidly became less and finally split up into small strings and became useless, and it is a fact worthy of note that at the great and profitable mines in Thetford and at Black Lake soapstone is absent from the rock mass.

Since the asbestos veins occur throughout the mass of rock, and come directly to the surface where exposed, as in the hill at Thetford mines and the great escarpment to the southeast of Black Lake station, the mining of the mineral is simply open-quarry work, the entire rock being removed, broken up, and the veins of asbestos separated by hand cobbing, in so far as the size of the veins will warrant the expenditure of labor for this purpose. The bulk of the barren serpentine necessary to be removed in order to obtain a ton of fibre is consequently very great, and while no exact data are to hand by which the relative proportion of asbestos and serpentine can be determined, it has been estimated to range in the ratio of 25 to 1 in very prolific ground, to 50 to 1 in ordinary mining. Of course, in such a great quantity of waste rock, under the present system of working, many small veins or portions of veins are not removed, owing to the expense and difficulty attending such operations by hand labor only, and the great heaps of waste material have accumulated till they now occupy large areas of valuable ground.

The history of asbestos mining presents some points of interest in view of the rapid growth of the industry. Comparatively little importance was attached to the mineral, from the economic standpoint, in the early days of the Canadian Geological Survey's operations, and this, combined with the fact that, although asbestos had been known before 1850 in the serpentines of the Eastern Townships, the quantity seen at the places where discovered was very limited, led to the result that but little heed was paid to its occurrence. In 1877, owing to the burning off of the forest in Thetford and Coleraine townships, the hills of serpentine became laid bare, and the weathering speedily produced the peculiar felting of the asbestos fibre on the surface wherever veins occurred. This was observed by a French-Canadian named Fecteau, it is stated, and the importance of the new material was soon ascertained, which resulted in the establishment of mining operations on a small scale in the summer of the same year, by the Johnson's Asbestos Mining Company, although the credit of the first attempt at working should probably be given to the Ward Brothers. The areas in the immediate vicinity were speedily secured and new mines located, since which time the growth of the industry has been constant and rapid, the output increas-

*From a paper read before the "Asbestos Club," Black Lake P. Q., February, 1891.

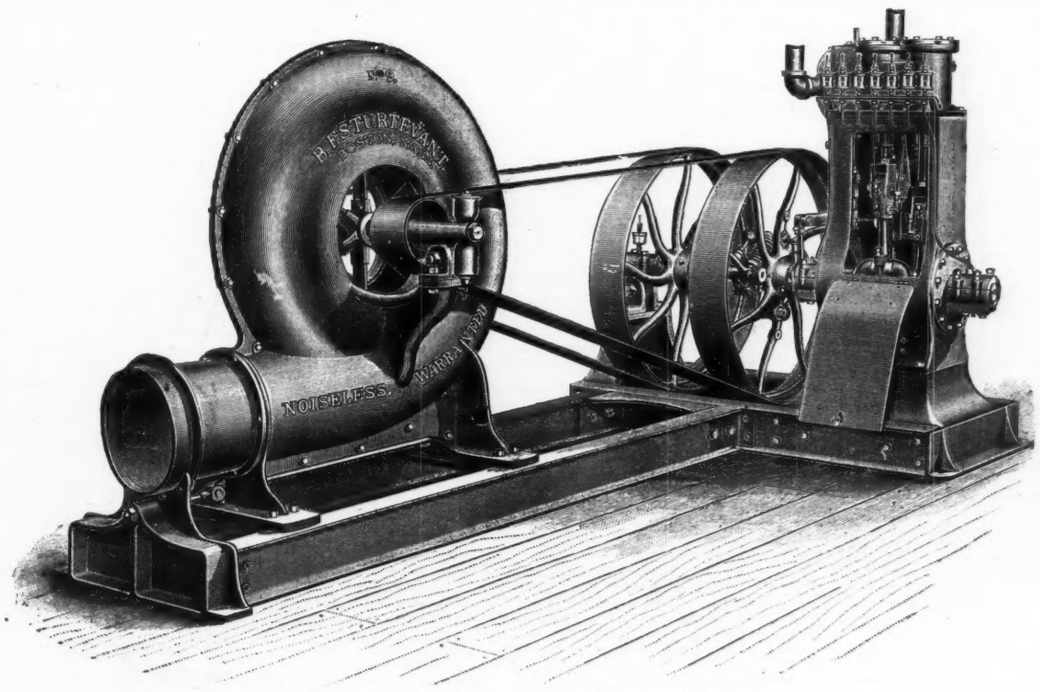
ing from 50 tons only in 1878 to probably not far from 8,000 tons in 1890, while the prices have also advanced within the last year or two at a like wonderful rate, till now No. 1 Quebec asbestos commands probably as good a price in the market as the best Italian, while No. 3 brings nearly as much as was obtained for No. 1 six years ago.

According to the Ontario Commission's Report, actinolite mining in that province was commenced in 1881, since which time about 3,000 tons have been extracted. This material, however, does not command the price of the Thetford mineral, selling at about the same figure as the waste or No. 4 from that locality, it being used almost entirely for asbestos roofing, for which purpose it is mixed with tar, as already stated, and then applied in a coating of about half an inch in thickness. The waste from the mines of the Eastern Townships, and formerly the output graded No. 3, was at one time quite extensively used for the same purpose.

The abestos of Templeton was probably first mined in 1883, but the industry has never proved very remunerative, owing to the limited nature of the deposit and the smallness of the veins, so that for some years mining was entirely abandoned. During the last season, however, operations have been started anew, and some very excellent fibre taken out, it is claimed, at a profit. The conditions under which the asbestos occurs in this district are distinct from those which are found both at Kaladar in Ontario and in the serpentine areas of the Eastern Townships, the serpentine in which the asbestos veins occur being intimately associated with crystalline limestone, and in many places the latter is highly serpentinous. The fiber of the asbestos is distinguished from that of Thetford in having a marked pearly and wavy luster, in being generally lighter colored, and by an entire absence of impurities in the form of iron grains. Sufficient study of these peculiar rocks has not yet been made to pronounce definitely upon their probable importance, but when the deposits are made more accessible considerable mining will undoubtedly be done, as these appear to be quite extensive.

Mining Interests in Mexico.—President Diaz of the Republic of Mexico, in a recent message to the Congress of that country, said, concerning its mining interests, that "since the middle of August of last year, according to returns received from 12 states, 606 new denouncements of mines have been recorded. During the same period 35 contracts have been made for the exploration and operation of mining zones and 6 for the erection of metallurgical works. The above contracts, together with those previously concerted, make a total number of 296, of which 62 have been forfeited, owing to the failure of the *concessionaires* to fulfil their stipulations. The amounts deposited as forfeit money in connection with these contracts, during the period already named, aggregate $19,000 in bonds of the public debt, making, with sums previously deposited for the same purpose, a total of $583,316. The activity displayed by some of the parties holding concessions for metallurgical works is worthy of mention. At Monterey smelting works have been completed and have begun operations, and others are in process of erection, both there and at San Luis Potosi."

Loss in Puddling Iron.—Mr. Thomas Turner, lecturer on metallurgy at Mason College, Birmingham, has presented an abstract of the results of some tests on tap cinders to the South Staffordshire Institute of Iron and Steel Works Managers, says the *Ironmonger*. For his experiments Mr. Turner obtained samples of boilings and tappings, both taken from the same heat, from various works during ordinary working with different irons. The samples were broken up and passed through sieves, being examined by eye, and with a moderately powerful magnet for globules of iron. It was found that all the boilings yielded globules of metallic iron, while none was met with in any of the tappings. The boilings yielded as much as 16 % of metallic iron—hence such a slag would mean a preventible loss of 3½ % of puddled bar. All these tests showed that the boilings were distinctly more impure than the tappings, and the analyses made by Mr. Turner show that for economical puddling it is necessary to boil away a considerable quantity of the first impure cinder, so as to be able to obtain a pure tapping cinder with the use of the smallest possible quantity of fettling.



STURTEVANT BLOWER AND DOUBLE UPRIGHT ENGINE.

THE STURTEVANT BLOWER AND DOUBLE UPRIGHT ENGINE.

The arrangement of blower and double engine shown in the accompanying cut is a recent design by the B. F. Sturtevant company. The blower is of its well known steel-pressure blower type, but mounted on an I beam foundation frame, to which it is securely bolted and upon which it is readily adjustable by means of the adjusting bolt shown at the outlet end. By the use of this bolt constant pressure is maintained on both belts, avoiding stoppage for re-lacing the belts, and making it possible to run continuously without loss of time by shutting down to tighten belts. The outlet is arranged in telescopic form so that the adjustment of the blower in no way affects the position of the pipe.

The engine foundation is firmly connected to the foundation of the blower. The engine, specially designed, is double in form, comprising two cylinders supplied by a single valve, and acting upon the shaft through the two cranks which are situated opposite each other, the object of which is the perfect balance of the engine and the attainment of high rotative speed. To avoid all danger to the bearings from flying dust, the entire engine is enclosed, its parts being readily accessible through the door shown in the cut.

All wearing parts are of steel and of large size, so that friction is reduced to a minimum. The oiling of all parts is accomplished by a series of sight-feed oil cups, placed together upon a bracket attached to the frame of the engine, from which tubes lead to the various bearings.

The regulation of the engine is secured by the shaft governor, forming a part of one of the pulleys, and acting through the eccentric to change the throw of the valve and vary the cutoff from 0 to ¼ stroke. All three bearings are of the brush-oiler type, and provided with reservoirs from which all surplus oil is fed back to the bearing.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office:

TUESDAY, APRIL 21st, 1891.

450,616. Method of Burning Fuel in Furnaces. Ellis F. Edgar, Woodbridge, N. J.
450,632. Cross Head Block for Engines. Nathaniel Lombard, Boston, Mass.
450,636. Furnace Bosh Plate. Thomas M. Pollock, Briar Hill, Ohio.
450,656. Core Drilling Machinery. Moses Beal, Elyria, Ohio.
450,666. Machine for Welding Metals. Herbert E. Fowler, New Haven, Conn.
450,713. Armor Plate and Method of Manufacturing the same. Henri A. Brustlein, Unieux, France.
450,739. Metallic Railway Tie. Theodore R. Dunning, Middletown, N. Y.
450,756. Ore Washer. William S. Hull and James C. Anderson, Sheffield, Ala.
450,761. Gold-Saving Apparatus. Olin H. Bagley, Astoria, Oregon.
450,776. Method of Casting Armor Plates. Stefan Siemang, Vienna, Austria-Hungary.
450,868. Feed Table of Rolling Mills. John Morgan, Pittsburg, Pa.
450,902. Boiler Feeder and Meter. John E. Winder, Pacific, Mo.
450,921. Machinery for Drilling Rocks. Richard Stephens and William C. Stephens, Pool, England.
450,935. Injector. Otto L. Hallbeck, West Salem, Ill.
450,940. Steam Boiler. Rudolph D. Kassing, St. Louis, Mo.
450 971. Coal Cutting Machine. James H. McEwen and Burr E. Cartwright, Ridgway, Pa.; said Cartwright Assignor of two-fifths to David Robertson, same place, and Samuel Hines, Scranton, Pa.
450,974. Boiler Cleaner. Henry C. Nye, Syracuse, N. Y., Assignor by direct and mesne assignments, to the Nye Boiler Cleaner Company, same place.
451,001. Wire Rolling Machine. Louis Goddu, Winchester, Assignor to the McKay Metallic Fastening Association, Boston, Mass.
451,002. Roll for Utilizing Old Rails. Henry Harris, Reading, Pa.

PERSONALS.

General John Newton, of this city, has resigned the position of consulting engineer of the Chicago, Ill., drainage canal.

Prof. Wm. P. Blake has just completed and put into successful operation a large roasting furnace of novel construction for the Wisconsin Lead and Zinc Company, at Shullsburg, Wis., and has now gone to Salt Lake City and Montana.

Mr. F. I. Freeman has accepted the position as general superintendent of the Totten & Hogg Iron and Steel Foundry Company, at Pittsburg, Pa., vice Robert C. Totten resigned. He leaves the Ætna Machine Company, of Warren, Ohio.

Capt. John Plummer, who has taken the management of the De Lamar Mining Company, of Idaho, has decided to retain the management of the Elkhorn Mining Company, of Montana, also, at the desire of the directors of the latter company. Mr. C. A. Molson will remain with the Elkhorn as sub-manager.

Dr. J. C. Branner, the state geologist of Arkansas, it is stated, has been offered the chair of geology in the Leland Stanford University of California. Dr. Branner according to reports has two years' work yet before him in Arkansas and he is undecided whether to accept the position at once or wait until he finishes his work there.

Mr. T. F. Cole, who for some time has been superintendent of the East Negaunee, Mich., properties of the Sch lesinger syndicate, has been promoted to the position of general manager of all that syndicate's properties. Mr. John D. Jeffery, formerly mining captain at these mines, succeeds Mr. Cole as superintendent.

Mr. William A. Angus, for several years cashier of the Bell Lewis & Yates Mining Company, has been appointed assistant treasurer of the Fairmount Coal and Coke Company and the Northwestern Coal and Iron Company, with offices in Buffalo. He succeeds the late Mr. Alexander White. Mr. Angus' position with Bell, Lewis & Yates has been filled by the appointment of Mr. Richard K. Wheeler.

Mr. C. H. Oliver, well known in the mining sections of the Pacific states, left on Monday, the 13th, for Durango, Mexico. Mr. Oliver has gone to assume duty as superintendent of the Trinidad De Penoles mine, situated at the town of Penoles, 55 miles west of Mapmi station, on the Mexican Central railroad, and about 500 miles south of El Paso, State of Durango. There are 20 men at present employed at the mine above and below ground.

There has been a number of changes in the personnel of the Jersey Central's staff of officials. Mr. Geo. S. Jones, who for several years held the position of secretary of the Lehigh and Wilkesbarre Coal Company has been appointed vice president of the North American Company. Mr. Geo. S. Harris, vice president of the Jersey Central has declined a re-election and will devote his time to the management of the Lehigh Navigation Company. The vacancies will be filled by the election of Mr. W. G. Oakman, who is now vice-president of the Richmond and Danville Railroad Company.

The suit for libel brought by Mr. Thomas H. White, mining engineer, of Deadwood, S. Dak., against the New York *Herald*, came up for trial before Mr. Baron Pollock, in London, on the 13th inst., with the result that the plaintiff was completely vindicated, the defendant apologizing, withdrawing the libellous statements and paying Mr. White £500 damages and £250 costs, the case being settled before going into court. The circumstances of this case, it will be remembered, have already been described in the ENGINEERING AND MINING JOURNAL. Mr. White, in 1887, wrote a series of letters from Deadwood to the London *Financial News* on the Harney Peak Tin Mining Company, which resulted in the withdrawal of that company, which had been organized with a capital of £2,000,000. The New York *Herald*, through its London edition, took up the cudgels on behalf of the company and made a series of damaging charges against Mr. White, alleging that his reports on the property had been false and inspired by interested motives. The case of Mr. White was not so much a question of damages, as it was of character, and his friends in the West will learn of his vindication with pleasure.

OBITUARY.

H. D. Waterman, of the firm of H. D. & S. G. Waterman, iron and steel brokers, of St. Louis, Mo., died on the 15th inst.

Augustus B. Davis died of apoplexy at Philadelphia, Pa., on the 17th inst., aged 76 years. He was well known as an inventor and manufacturer of weighing machines and railroad car springs.

Philip Moen, president of the Washburn & Moen Manufacturing Company, died at his home in Worcester, Mass., on the 23d inst. He was born at Wilna, N. Y., in 1824, and began business life in New York as clerk in a hardware store, whose owners were selling agents for wire manufactured by Ichabod Washburn, in this city. Mr. Moen married Mr. Washburn's daughter in 1846, soon after went to Worcester, Mass., and in 1850 was taken into partnership by his father-in-law, under the firm name of I. Washburn & Moen, which continued until 1868, when the present corporation was formed. On the death of Mr. Washburn, in 1870, Mr. Moen became president of the company, which position he has held ever since. He was an exceptionally capable business man, and under his management the corporation prospered greatly, especially since it purchased the barb-wire patents. At the time of his death as many as 3,500 men were employed in the Worcester mills. Mr. Moen was always interested in educational and charitable matters, and was a liberal giver. He was a member of the board of trustees of the Worcester Polytechnic Institute.

Robert W. Waterman, ex-Governor of California, died at his residence at San Diego, Cal., on Sunday, the 12th inst., from a sharp attack of pneumonia, resulting from a severe cold contracted in the mountains. Like most of California's mining magnates, Governor Waterman was a self-made man. He was born in Herkimer County, New York, in 1826, but passed his early life in Illinois, where he received a common-school education. In 1850 he went to California but returned East in the course of a few years. In 1860 he again went West and tried ranching in San Bernardino county. As a farmer he was not a success, but he struggled along until 1879 and then found his proper vocation as a miner. His first operations were on the Mohave desert, and, after long prospecting, he struck a ledge of silver-bearing rock, which led to the development of the Calico mines. The larger portion of his wealth, however, was derived from his famous Stonewall mines on his Cuyamaca ranch in San Diego county, which have been the means of opening up the section of country in which they are situated. In 1886 he was elected to the office of Lieutenant Governor and succeeded to the position of Governor upon the death of Governor W. Bartlett. The estate of the deceased is estimated at about $8,000,000. He leaves besides his wife four children, the eldest of whom, Dr. J. S. Waterman, is resident physician at one of the New York hospitals.

SOCIETIES.

The American Society of Civil Engineers will hold its annual convention at Lookout Mountain, Tenn., beginning May 20, 1891.

The Engineering Association of the South held its regular monthly meeting at Nashville, Tenn., on the 9th inst. The death of Mr. H S. Butler, of Anniston, Ala., a member of the association, was announced. Resolutions were passed inviting the American Society of Civil Engineers to visit Nashville during the forthcoming annual convention of the society, and, if possible, to hold one session in that city. A paper, entitled "The Engineering Profession," was read by Major W. F. Foster, of Nashville.

The Geological Club of Philadelphia, Pa., has been organized as an offshoot of the Academy of Natural Sciences. The officers are as follows: President, Prof. Angelo Heilprin; vice-presidents, Edward H. Weil and Dr. Edward H. Williams; recording secretary, Dr. Benjamin Sharp; corresponding secretary, Mrs. William Righter Fisher; treasurer, Dr. S. G. Dixon; executive committee, Mrs. S. C. F Hallowell, Mrs. S. G. Dixon, Mrs. Walter Horstman, Joseph Wharton, Coleman Sellers, Jr., and Edwin S. Balch.

INDUSTRIAL NOTES.

The Carp furnace at Marquette, Mich., was blown out on the 24th inst., ostensibly for repairs. Unsold stocks of pig iron are given as the real reason for a suspension of operations.

The Edgar Thomson Steel Works of Carnegie & Co., at Pittsburgh, Pa., which have been closed for ten weeks, have resumed operations. The resumption, it is said, will be only for a short time.

The American Steel Wheel Company has been incorporated at Trenton, N. J., with a paid-up capital of $600,000, for the manufacture of car wheels, and railroad castings, probably in Jersey City, N. J.

The Pennsylvania Steel Works', Pa., employés, it is stated, will inaugurate a strike on the 1st of June, when the scale of the Amalgamated Association of Iron and Steel Workers will be demanded by the men.

The Pennsylvania Diamond Drill and Manufacturing Company, of Brodsboro, Pa., has received an order for one of its diamond-pointed prospecting drills from Calcutta, India. This machine and outfit will be shipped on the 27th inst.

The Katahdin Iron Works, of Maine, have been sold to a syndicate, which will remove the plant and erect it at Pictou, N. S., where a supply of iron and coal can be had. The works have been a failure in Maine of late on account of cost of raw materials.

The first American nickel-steel plates made have been received at the Navy Yard at Washington, whence they will be taken to the proving ground at Indian Head, Md., to be tested. The plates are 8 feet × 6 feet × 3 inches. The trial will take place shortly.

It is said that the proposed amalgamation of the Ohio & Western Coal & Iron Company and the Columbus & Hocking Coal & Iron Company, Ohio, has fallen through. Plans are under consideration for foreclosing the bonds of the Ohio & Western and forming a new organization, when the company will be in better shape for an amalgamation or to work on its own account.

The New Glasgow Iron, Coal and Railway Company (limited), Nova Scotia, has issued $500,000 of 8% first preference shares, and it is reported that four-fifths of the issue is already taken up. The whole issue of ordinary shares ($500,000) is held by the founders. In view of the amount of preferred shares already taken up the directors have felt themselves warranted in contracting for the furnace plant. They will also now arrange for the immediate construction of the railway and the further equipment of the iron mines, and we are assured that the first furnace will be producing iron before the end of the present year. Only one furnace will be built this year, but it is the intention of the company to begin a second furnace as soon as the first is in operation. These two furnaces will embody the very latest improvements for the cheap and rapid production of pig-iron. This company holds large areas of iron ores of fine quality, and two very large deposits of limestone, both the lime and ore being tapped by its own railway, the total length of which is only about twelve miles. It also owns two fine coal seams in the Marsh district, and not more than ten miles from the furnace site, which is extremely well situated as regards raw material.

SOUTHERN INDUSTRIAL NOTES.

(From our Special Correspondent.)

The Waco Artesian Ice Company has been incorporated at Waco, Tex., to succeed the Waco Ice Manufacturing Company. The site has been purchased and the factory will be erected at once. The capital stock is $100,000.

The Lownes Manufacturing Company, of Orlando, Fla., will build machine shops and an iron-foundry at Huntsville, Ala., for the purpose of manufacturing the Lownes patent wrenches and of doing a general machinery business.

The Audubon Iron Works Company, Limited, is proposed to be established at New Orleans, La., with a capital stock of $1,000,000. An ordinance has been introduced in the city council asking that privilege be given to L. W. Brown and others to erect a foundry, machine shops, dry docks, ship yards, etc., on the river front at Pine street.

The Oremont Iron and Coal Company has been organized at Potts Creek, Virginia, with a capital stock of $1,000,000. The following officers have been elected: C. D. Fenhagen, of Baltimore, Md., president; D. B. Taylor, of Baltimore, Md., vice-president, and Guy Cochran, of Staunton, Va., secretary. The company will develop coal and iron mines and build a new town at the mouth of Potts Creek and develop it. The Payne farm of 1,250 acres has been purchased and will be laid off into lots; also about 1,400 acres of New River coking coal lands, and 5,000 acres of iron lands have been purchased and will be developed.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office. No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

2,190. Machinery for grinding mica. Georgia.

2,191. A complete plant for mining, hauling and lighting, including the following machinery: A 100 horse power generator, a 50 horse power locomotive, coal cutters with a capacity of 500 tons per day, and all appurtenances necessary to make a complete installation. Length of line, 3,000 feet. Kentucky.

2,192. Complete machinery for a flouring mill of a capacity (10 to 20 barrels of flour in 24 hours), on the roller plan, with a water wheel for motor. New Mexico.

2,193. Machinery for water-works. Texas.

2,194. A 14 to 16-inch engine lathe, a 20-inch

drill press, a 24-inch shaper, and other similar tools. West Virginia.

2,195. T rails, fish bars, spikes and 6 switches for 2¼ miles standard gage dummy line, 1 passenger car, 4 flat cars, capacity 17,500 pounds each; 1 dummy engine, with capacity for drawing two cars, loaded with 12,500 pounds each, over a grade of 3½ feet in 100 feet, the shortest curve on a radius of 83 feet. Submit itemized estimates, with lowest prices for all necessary materials, delivered on board of cars at Gaffney City, South Carolina.

2,196. Electric light plant. Texas.

2,197. Ice factory machinery. Texas.

2,198. Shafting, belting, etc. West Virginia.

2,199. Machinery for a 40-barrel power flour mill for meal, etc. Virginia.

2,200. A 15 horse power boiler. Alabama.

2,201. A 50-saw gin and feeder power press. Georgia.

2,202. A detached engine and portable boiler, 15 horse power, for a hoop factory, with all the fixtures, viz., pump or inspirator, heater and pipes, to connect boiler and engine, etc. Tennessee.

2,204. Veneer machinery, scoring machinery, etc. North Carolina.

2,205. Engine, boiler and a complete plant for the manufacture of furniture. West Virginia.

2,208. A full line of machinery to equip a canning and evaporating factory. Virginia.

2,209. A good floor board machine. Alabama.

2,210. A shingle machine. Alabama.

2,211. A 150-horse power engine, 2 oil presses, 2 heaters, 1 cake former, and a set of crusher rolls, Mississippi.

2,114. A 150 horse-power engine for driving dynamos; 1,300 light alternator and the other 35—1,200 candle-power arc. Tennessee.

AMERICAN GOODS WANTED ABROAD.

2,165. Tile machinery. Australia.

2,166. Coal-cutting machinery. Australia.

2,167. Excelsior machinery. Australia.

2,168. Cotton oil presses and machinery. Australia.

2,169. Sheep-clipping machinery. Australia.

2,170. Machinery, forges, hammers, dies, etc., for making hoes, shovels, picks and other agricultural tools; also for bolts, nails and wire. South America.

2,203. Samples and prices of bleached and unbleached cotton, Augusta and Toledo plaids, Canton flannel, suspenders, blue denem of all qualities, twill cotton, hosiery, duck, celluloid collars and cuffs, ticks, J. & P. Coats' spool cotton, singlets, shirtings, Merrimack shirtings, and other cotton goods manufactured in America. West Indies.

2,206. A machine with a capacity of 50 tons per day, to treat or disintegrate tailings from a gold mine that have become caked by exposure to air. Machine to be shipped to Brazil. South America.

2,207. A mill for the fine grinding of pure pyrites. Give full particulars as to capacity of mill, tons per day, cost, power required to operate, description of process, etc. Mill to be shipped to Brazil. South America.

2,212. Mineral wool. Canada.

2,213. A ship for towing purposes. Central America.

GENERAL MINING NEWS.

TENNESSEE COAL AND IRON AND RAILROAD COMPANY.—After a conference held in New York recently between President Thomas C. Platt and John H. Inman, representing the majority in the control of the company, and General J. H. Bryant, representing the English syndicate, which offers $2,500,000 for the properties in Tennessee, and Thomas Barrett and other stockholders who object to the sale, it was formally decided not to press the sale to the English syndicate.

WOODLAND OIL COMPANY.—This company, recently organized, has elected the following officers: T. J. Vandergrift, president; Cyrus Underwood, vice-president, and H. P. Grayson, secretary and treasurer. The company has 30,000 acres of territory in Monroe county, O., where oil was found recently, and it also has land in West Virginia, Washington county, and in Allegheny county, Pa., which will be developed.

ALABAMA.

JEFFERSON COUNTY.

(From our Special Correspondent.)

LADY ENSLEY COAL, IRON AND RAILROAD COMPANY.—The manager of this company is arranging to open the new Bessie coal mines in Walker county. One hundred and fifty new coke ovens will be built at the Bessie mines at once. The Kansas City, Memphis & Birmingham Railroad will build a branch line to them. The company has fired up 100 new coke ovens at Horse Creek.

MORRIS-GROSS MINING COMPANY.—This company is now putting out 300 tons of coal daily at its mine at Carbon Hill, and is opening up another shaft. The Kansas, Memphis & Birmingham Railroad Company is surveying a branch road to these mines.

WATTS COAL AND IRON COMPANY.—A meeting of the stockholders of this company was held at its office in Warrior, Ala., on the 9th inst., for the purpose of electing officers, issuing $60,000 of first-mortgage bonds, etc. The directors elected are: G. S. Watta, Baltimore, Md.; J. E. R. Crabbe, Baltimore, Md.; J. E. DuBois, Nashville, Tenn.; A. W. Graham, Oxford, N. C.; W. M. Morgan, Durham, N. C.; J. S. Morehead, Charlotte, N. C.; G. D. FitzHugh, Blount Springs, Ala.; J. F. B. Jackson, Birmingham, Ala. The officers are: A. W. Graham, president; Col. J F. B. Jackson, vice-president; and William C. Ruffin, secretary and treasurer. Measures were adopted looking to still further development of the property and increasing the output of coal.

ARIZONA.

MOHAVE COUNTY.

SAN FRACISCO, April 15.

(From our Special Correspondent.)

ARNOLD GOLD AND SILVER MINING COMPANY.—This corporation was organized in 1886, and had offices at 320 Sansome street, San Francisco, A. Judson being secretary. It was capitalized at a good round figure, most of the money being furnished by Eastern men. The mine did not come up to the expectations, however, and in 1888 the company, so far as can be learned, did not dissolve but simply died out. Since then, no attempt has been made to revive it, but just at present it again figures before the public in a curious manner. There is $25,000 now waiting to be paid over to some one representing it, and, rather strangely, no legitimate claimant can be found. It seems that when the company commenced operations at the mine, a full mill and hoisting plant was put in. The mill was paid for in cash to the Union Iron Company, but the hoisting plant was obtained on credit. When the Arnold Company failed the Georgine Milling Company bought the hoisting plant for $25,000, but the company faded out of sight in the most mysterious manner before the money was paid over, and now there are doubts as to who is justly entitled to it. Morally, the Union Iron Works are justly entitled to the money, but though efforts have been made, no legal owner can be found although a liberal reward has been offered by the Georgine Milling Company for any information that will lead to the discovery of such persons.

CALIFORNIA.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—A reporter of the ENGINEERING AND MINING JOURNAL, upon inquiry at the eastern office of this company, 120 Broadway, New York, learned that for the week ending the 9th inst. an advance of 15 feet had been made in the upraise—a total of 109 feet. On the face there is 15 inches of vein matter, said to be better than anything encountered during the 50 feet last passed over. This upraise was stopped on the 9th inst. in order to permit the starting of the stopes. The mill, which has been idle for several months, started 20 stamps on the 8th inst.

MONO COUNTY.

(From our Special Correspondent.)

J. H. Jewett and others have obtained judgment against the Spring Valley Mining Company for $5,100 and costs. The defendant is better known as the Cherokee Mining Company, which has been using the lands of the plaintiffs as a dumping place for hydraulic debris. The company agreed in 1889 to pay $500 per month for the privilege of using their lands as a dump. Only a part of the amount has been paid, leaving a balance of $5,100 still due when plaintiffs brought the suit.

STANDARD CONSOLIDATED MINING COMPANY.—The mill is running steadily and making regular monthly bullion shipments; since the snow came and stopped freighting a large quantity of concentrates have accumulated, and there is some talk of the company putting up chlorination works, and working them here. The mine is at present being operated under the management of Mr. E. L. Benedict.

NAPA COUNTY.

SILVERADO MINING COMPANY.—Work on this company's property, on Mount St. Helena, is progressing, and the results thus far are satisfactory. A vein of good size is being developed, and high-grade ore is being taken out as the work of prospecting progresses.

PLUMAS COUNTY.

HUNGARIAN HILL GRAVEL.—Judge Sawyer, of the United States Circuit Court, has issued an anti-debris injunction against John B. Sutton, Henry Orr, Joseph Braden and Joseph Kelly, owners of the Hungarian Hill gravel mine. The complainants are A. Agassiz and Quincy A. Shaw. They are owners of land in American Valley, which, as set forth in the complaint, is in danger of injury by the discharge of debris should the mine be started anew, as is threatened.

SIERRA COUNTY.

BALD MOUNTAIN EXTENSION MINING COMPANY.—Gravel is reported to have been recently struck in the new tunnel. This company located its claims, northeast of Forest City, 1874, commenced its old tunnel in the fall of 1878 and in 1882 found its first pay gravel. It continued working, with varying success, until the fall of 1888, when the gravel channel was found to have been cut off by a cross channel, all work at a profit was at an end. A year before this time a new tunnel had been started in a branch of Kanaka Creek, and over a thousand feet completed. Upon the giving out of the old channel work was pushed on this new work, and it was expected the old channel would be tapped at a point on the ridge near where the old Dan Cole road intercepts the Henness Pass road. The tunnel has been pushed from that time until now, when the long looked-for channel has at last been found. For some time past the tunnel has been in a yellowish slate formation, and last week it was decided to raise a shaft. At a height of 54 feet above the tunnel, rim gravel, which prospected as such gravel usually does, was found. The shaft was raised four or five feet into the gravel, which showed beyond doubt that it was on the edge of a channel. The tunnel had been run in the meantime until it is now about 60 feet ahead of the shaft in soft white slate. When the tunnel is 100 feet beyond the prospect shaft, another upraise will be made. The main tunnel is a little more than a mile long.

COLORADO.

Mineral Surveys approved by the United States Surveyor General of Colorado, during the week, ending April 18th, 1891: Survey number, 6862, Land District, Garfield, name of claim, Excelsior; 6874, Leadville, Vance; 6849, Leadville, Mary E. Galvin, Juniper and Juniper No. 2; 6877, Leadville, Astor and Vanderbilt; 6896, Gunnison, Forfeiture; 6858, Garfield, Ground Hog; 6542, Montrose, Garibaldi and Domingo; 6882, Central City, Santa Cruz, Palma and Teneriffe; 6839, Central City, West Doves Nest.

CLEAR CREEK COUNTY.

(From our Special Correspondent.)

SILVER AGE MILLING AND MINING COMPANY.—This company has just completed its new concentrating works of 35 tons per day capacity, and will commence dressing low-grade ore by the 1st of May. The works are run by water power, the water being conveyed to the mine through iron pipes over a mile in length, and furnishing more than 850 H. P.

GILPIN COUNTY.

NEW CALIFORNIA MINING COMPANY, LIMITED.—An important strike has been made in the bottom of the California shaft, which is sinking, and is now down over 2,100 feet. Two feet of ore, assaying 6½ ounces gold, has now been uncovered. Some rich ore has also been opened in the 2,000 level.

LAKE COUNTY.

CONTINENTAL CHIEF.—The owners of this mine have decided to erect dressing works of 100 tons daily capacity. They will be located about 500 feet below the lower tunnel. The ore to be dressed is said to average about 7% lead and 15 ounces silver, the gangue being silica and baryta. A vast amount of high-grade ore is exposed in this mine, and it is now one of the largest producers of the Leadville district.

IRON SILVER MINING COMPANY.—It is reported that this company is shipping at the rate of about 1,800 tons of ore per month from the Moyer mine. The ore is nearly all pyritous. A force of 150 men is employed, and a large amount of exploration work is being done.

PENROSE.—An important development has been made in this property, which is located not far from the center of the city, at the corner of Alder and Fourth streets. The diamond drill, sinking from the bottom of the shaft, has cut 10 feet of excellent contact matter and preparations are now being made to sink the shaft at once.

SMUGGLER MINING COMPANY.—Mr. John F. Campion has sold his interest in this company to Mr. G. H. F. Meyer, of the Ulster-Newton Mining Company, and the latter will manage it in the future. It is said that vigorous steps will be taken to develop the unexplored ground of the company. The Smuggler was once a large producer.

THESPIAN.—A large body of argentiferous iron ore has been struck in this mine at a depth of 520 feet. A winze, at last report, showed 14 feet of ore, and the bottom not reached. The Thespian is located on the east slope of Carbonate Hill, and the strike is considered important (although the ore is of low grade), as it is in a portion of the Leadville district comparatively unexplored.

TERRIBLE MINING COMPANY.—A large amount of development work is being done from the Ward shaft of the Adelaide mine and it is reported that a promising discovery of ore assaying 15% lead has been made in the new workings, by a drift run to the west, from the bottom of the Ward shaft. The property is being worked by lessees.

OURAY COUNTY.

The Silverton railway which has been blocked with snow for many weeks, has been opened, and shipments of ore from the Red Mountain mines resumed.

IRONCLAD MINING COMPANY.—This company has purchased the Finance and another lode adjoining its own property. The number of shares listed at the Mining Exchange in Denver has been increased to 100,000.

MICKEY BREEN MINING COMPANY.—This company has struck a streak of ore, of excellent grade, in the Albert vein.

PAYMASTER.—A good body of ore was uncovered in this mine last week. It is said to be of high

grade and was found on the fourth, or 400-foot, level, 200 feet from the shaft.

RED ROSE.—This property, located near the Queen of Ouray, is reported to be showing up well. An exploring level has been run 300 feet on the vein recently, and the high-grade ore taken out in the course of the work returned $2,240, net. The ore runs from 20% to 60% lead, and 40 to 250 ounces silver. Low-grade ore running from $15 to $35 per ton, taken out in driving this level, has not been shipped.

PITKIN COUNTY.

ARGENTUM-JUNIATA MINING COMPANY.—Three men were killed and two wounded by a premature explosion in the Cameron mine of this company on the 18th inst. The workings of the mine consist of a tunnel 900 feet long, from the end of which an incline 700 feet long is sunk. The men were engaged in cutting a station at the foot of the incline, and were firing a round of 24 shots.

PUEBLO COUNTY.

PUEBLO SMELTING & REFINING COMPANY.—At the annual meeting of the stockholders of this company recently held in Pueblo, the following gentlemen were elected directors: E. F. Waters, Alden Speare, A. P. Tapley, G. S. Harwood, S. S. Sleeper, N. W. Bumstead, E. H. Mason, Thos. Nickerson, A. E. Reynolds and M. D. Thatcher. President Mason and Treasurer Foster Nichols resigned, E. F. Waters suceeding the former and L. R. Richie the latter.

SAN MIGUEL COUNTY.

GOLD KING MINING COMPANY.—The creditors of this company have reorganized it under the title of the Gold King Consolidated Mining Company, with a capital stock of $6,000,000 in 600,000 shares of $10 each. An assessment of 60 cents per share has been levied on 300,000 shares, and the stock of the new company will be exchanged for that of the old, share for share, upon payment of this. The remaining 300,000 shares are to be cancelled or divided *pro rata* as the directors may direct.

SUMMIT COUNTY.

FARNCOMB HILL MINING COMPANY.—The superintendent of this company, operating at Breckenridge, reports a rich strike in the 100-foot level from the main shaft.

MOHAWK MINING COMPANY.—The property of this company was sold under a trustee's deed on the 9th inst. It was bought in by St. Louis people.

ROBINSON CONSOLIDATED MINING COMPANY.—An important strike is reported to have been made in a portion of this company's mine, which is being worked under lease by Mr. James G. Fleming. A good face of ore, assaying 50 ounces in silver per ton, has been uncovered, and is said to be improving with every shot.

IDAHO.

ALTURAS COUNTY.

J. O. Swift, E. B. True and W. B. Watt, enterprising mining men of Hailey, left Bellevue recently for Salt Lake, Denver and Omaha, to confer with the traffic department of the Union Pacific Railroad and smelter people, regarding the transportation rates and smelting of Wood River ores. As was recently mentioned in this column, ore rates have been raised to figures which if allowed to stand, will seriously cripple the mining industry, if indeed it does not annihilate it. The plan decided upon is to secure concessions by asking the railroad to increase all the inward merchandise rates to Wood River points 10 cents per 100 pounds, and in lieu thereof restore to the Wood River mines the ore rates in effect in the years 1889 and 1890, which were $10.60 to Denver and $12 40 to Omaha. This procedure would not only reimburse the railroad company for the reduced ore rates, but would largely increase ore shipments, while the merchants, it is said, will scarcely feel the slightly increased rates. A thorough canvass made among the merchants results in a universal approval of the plan, they realizing that the annihilation of the mining interest would result in a stagnation of business. No pains will be spared to carry the movement to a successful issue. The Red Elephant, Red Cloud, War Dance, King, Idahoan Queen, Relief, Michigan and Modoc Chief, which are all prominent producers, are represented in the movement.

CUSTER COUNTY.

DICKENS-CUSTER MINING COMPANY, LIMITED.—This company has bought the Lucky Boy mine. The company's mill will be put in operation about May 1st.

LOGAN COUNTY.

PEARL.—An important discovery was recently made in this mine, situated on Lookout Mountain on the east side of Wood River valley. The Pearl is a relocation of ground formerly known as the Deadshot and was recently leased to Steen & Dayton. The ore is said to assay nearly $500 in silver and 70% lead. What adds particular interest to this find is the fact that it was made on the east side of the river, where up to now, comparatively little successful mining has been done.

OWYHEE COUNTY.

Some fine lignite coal has, according to the Silver City *Avalanche*, recently been taken from a mine not far from the Democrat, on the Reynolds Creek road. It is jet black, hard and free from gypsum, and burns down to a small per cent. of white ash. The vein is two feet thick.

DE LAMAR MINING COMPANY, LIMITED.—A great deal of trouble has been encountered in starting the electric hoist which was put in some time ago at the winze. New and larger wires were telegraphed for, and arrived on the 21st of last month; they were immediately put in place and everything was in readiness for another trial on the 24th, when the switchboard burned out. The mine keeps up its record as a producer, the production last month amounting to $110,000, with expenses of $25,000, leaving a net profit of $85,000. This will doubtless be largely increased when the developments in contemplation are carried out.

SHOSHONE COUNTY.

BUNKER HILL AND SULLIVAN MINING COMPANY.—The large new concentrating mill of this company is reported to have been started recently. A trial run was first made which proved perfectly satisfactory, and now the works are in full operation.

INDIAN TERRITORY.

Permission has been granted the Topeka, Okmulgee & Gulf Railroad, a Kansas corporation, to run from Topeka through Indian Territory, through or near Okmulgee, in the Creek Nation, to some point on the southern boundary, thence across the State of Texas to the Gulf of Mexico. It will open up vast coal fields in the Indian Territory now lying dormant for want of proper transportation facilities.

KANSAS.

A special report shows that during the week ending April 18th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,284,680; zinc ore, pounds sold, 640,000; lead ore, pounds sold, 47,350; sales aggregated a total value of $7,850.

KENTUCKY.

Several thousand coal miners are expected to strike at Jellico unless some agreement in regard to the spring scale of wages is reached.

MICHIGAN.

COPPER.

FRANKLIN MINING COMPANY.—The Franklin miners went to work on the 15th inst.; all parts of the mine and stamp mill are now running.

QUINCY MINING COMPANY.—At the office of this company an ENGINEERING AND MINING JOURNAL reporter learned that the fire in the Pewabic mine has burned out, and that men are at work in certain of the burned portions making repairs. According to recent advices from Agent S. B. Harris the woodwork in No. 6 shaft was found to have been destroyed as far as explored or to the eighteenth level, and it is believed to have been burned to the water or twenty-sixth level. The Manengin shaft is destroyed from the eighteenth to the sixth level, and burned in places from the sixth to the second level. Captain Harris says: "I do not believe the fire has done us much real or prospective damage. No. 6 shaft will be used for hoisting purposes, and is now being retimbered."

IRON.

MARQUETTE RANGE.

(From our Special Correspondent.)

BUFFALO MINING COMPANY.—The Prince of Wales, Queen, Buffalo and South Buffalo mines, constituting the Schlesinger-Negaunee group, have been consolidated and will hereafter be known as the Buffalo.

MICHIGAMME IRON COMPANY.—The entire force of 300 men employed at the Michigamme mine has been discharged and the pumps have been pulled up. The shut down is due to the prospect of an extended depression in the ore market.

MENOMINEE RANGE.

The Norway *Current* says that the Mastodon, Mansfield, Shafer, and Hemlock mines have sold small lots of ore, and will ship as soon as navigation opens.

CHAPIN.—The working force is slowly being decreased, and the daily output amounts to about 1,200 tons. There is now in stock about 100,000 tons. About 300 tons per day is being shipped by all-rail. "D" shaft is nearly down to the seventh level. Fully 1,400 feet more of the water level remains to be driven. The new hoisting plant at this shaft, it is expected, will be completed this week.

HAMILTON ORE COMPANY.—At this company's mine the putting-in of the wooden runners to replace the wire rope guides in No. 1 shaft has been completed and ore-hoisting operations commenced. No. 2 shaft is 1,003 feet deep.

MONITOR MINING COMPANY.—This company's property has been taken by the sheriff, and mining operations suspended. It is said that there are $60,000 in claims against the company, of which $20,000 is in labor liens.

MISSOURI.

CITY OF ST. LOUIS.

(From our Special Correspondent.)

ST. LOUIS SMELTING AND REFINING COMPANY.—A portion of the works of this company burned on the evening of the 20th inst.; cause unknown. The buildings consumed covered about 200 by 150 feet, and were totally lost. Two carloads of imported silver-refining pots had just been stored in the part destroyed, which are a total loss, as well as all the machinery of this department, a costly dynamo almost new, copper magnet bars, etc. The loss will exceed $100,000.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, April 20.

The heavy spring rains of the past week proved detrimental to mining operations, as many small operators were entirely drowned out, which, with a drop of $1 in the price of zinc ore, has made rather a small output. Following are the sales from the different camps, so far as reported:

Joplin mines, 1,249,527 pounds zinc ore and 142,042 lead; value, $16,699.36.

Webb City mines, 943,050 pounds zinc ore and 65,800 lead; value, $11,761 90.

Carterville mines, 1,696.640 pounds zinc ore and 73,360 lead; value $13,750,82.

Oronogo mines 22,050 pounds zinc ore and 3,500 lead; value $317,53.

Zincite mines, 180,140 pounds zinc ore and 1,580 lead; value $1,979,29.

Galena, Kans mines, 840,000 pounds zinc ore and 47,350 lead; value $7,850.

District, total value $52,388,40.

Collins & Peterson are opening a new shaft on their Little Nellie mine, which will largely increase their output. A very large body of zinc ore has been opened in this property. So far the owners have only been handling the free ore, but they will now put up a crusher and rolls so as to handle the disseminated ore, of which they have a large amount. The Petrie mine, on the Empire land, made a production last week of 52,760 pounds clean zinc ore. The Astor mine, just north of the city limits, has just completed a general overhauling of its machinery, and this week will commence to work a double shift. Slumm & Arnold, operating on the Snyder lease, made a good run last week, and produced 83,680 pounds zinc ore.

The old Oronogo Camp, which has been very quiet for the past few years, is again coming to the front as a steady producer. Many new shafts are being sunk, and some good ore bodies are being opened.

MONTANA.

DEER LODGE COUNTY.

(From Our Special Correspondent.)

DEER LODGE MINING & REDUCTION CO.—This company, whose property is fourteen miles from Drummond, has opened a large body of lead-carbonate ore. It is preparing to ship to the Kansas City Smelting and Refining Company. The property is stocked for 500,000 shares, and is owned principally in Deer Lodge and Butte. Superintendent Sherr is authority for the statement that the lode at a depth of 200 feet is 130 feet between walls. The ore shipped to Kansas City will average 40 ounces silver and 40% lead. In addition there is a large amount of low-grade ore of about 20 ounces silver and the same per cent. lead exposed. The company will undoubtedly build a smelter next season. The ore forms a very desirable flux, some of it running as high as 40% iron, with only about 3½% silica.

GEORGE.—This mine located on Lost Creek, 12 miles southwest of Anaconda, is producing some very fine lead carbonate ore. Twenty tons recently shipped to Great Falls netted over $1,000. This is a new property owned in Anaconda. As soon as the snow will permit, its owners will commence regular shipments to Kansas City. This mine, like the Blue Eyed Nellie, is in white limestone. The owners are very sanguine, and the prospects of their property are certainly excellent.

ELIZABETH MINING COMPANY.—During the week considerable excitement was caused in St. Louis by the report that the Bi-metallic vein extends into this property, and does not, as was generally supposed, pass north of it. On Monday afternoon a telegram was received from Superintendent Dodds, saying that six inches of ore had been struck in the north vein assaying from 30 to 200 ounces. The news was accepted as proof that the north vein in the Elizabeth was identical with the Bi-metallic vein. Such a conclusion seems, however, decidedly premature.

JEFFERSON COUNTY.

ELKHORN MINING COMPANY, LIMITED.—During the month of March the mill crushed 1,037 tons. Bullion was shipped to the value of $40,060, and 205 tons of smelting ore sold, yielding $13,610, the total produce being $53,670. Total working expenses amounted to $22,486. The first annual general meeting of the company was held in London on the 9th inst.

LEWIS AND CLARKE COUNTY.

MONTANA COMPANY, LIMITED.—During March 6,574 tons of ore were milled. The yield was $85,000, and the working expenses $54,100.

UNITED SMELTING AND REFINING COMPANY.—The annual meeting of this company, of Helena, was held in New York, on the 13th inst. It was voted to expend $100,000 in increasing the capacity of the East Helena smelter and work was ordered to be begun at once. Abram S. Hewitt was elected president of the company, Mr. Cromwell, first vice-president and A. Eilers, general manager.

MISSOULA COUNTY.

(From our Special Correspondent.)

GRAY COPPER, GOLD AND SILVER MINING COMPANY.—President C. H. Clark is having sacked for

shipment to the Kansas City Smelting Works a car of high-grade galena ore from the Hecla mine belonging to this company, which is located four miles from Thompson's Falls The property is being developed by an adit tunnel, and only the ore broken in this work is being taken out. The grade of this lot will be about 250 ounces silver, $12 gold, and 45% lead. The lode is widening as depth is gained, but has not as yet reached any great dimensions. The company is a recent organization and is capitalized at $500,000 in 250,000 shares. A large block of treasury stock has been sold in Butte and Minneapolis. It is expected that this will be one of the dividend payers in the next six months. The property is an extension of the Buckeye mine, a steady dividend payer, which is owned in Helena.

NEVADA.

LINCOLN COUNTY.

PIOCHE MINING AND REDUCTION COMPANY.—It is reported from Salt Lake that arrangements have finally been completed between this company and the Union Pacific Railway Company whereby the railway from Milford to Pioche, which is already graded, will be completed, and that the work will be commenced within 30 days. The negotiations to this effect were completed by Mr. W. S. Godbe, president of the company, during his recent visit to New York. The Pioche company has agreed to supply the railway company with 150 tons of ore per day for shipment.

The Pioche company had previously decided to remove its present furnace to the site selected some distance below Pioche, and to add another of larger capacity with room for a third. The new works are to be fitted with the best machinery for economical treatment, and the narrow-gauge railway of the company is to be extended to the new site. The construction of the new works had already been commenced when the arrangements for the completion of the railway were effected.

Developments in the Day mine since the publication of Mr. Maynard's report (see ENGINEERING AND MINING JOURNAL February 7th) are officially stated to have been of the greatest importance, a new ore body of immense size and higher grade than any yet found in the mine having been uncovered. The ore was first struck on Christmas Eve, and, although exploration work has been continued steadily ever since, no limit to the ore body has been found. The Onondaga, Half Moon, Yuba, and Mendha mines also have been showing up very well. With the completion of the railway to Pioche the company expects to make a large production; at the present time little is being done outside of prospecting and development work.

STOREY COUNTY—COMSTOCK LODE.

(From our Special Correspondent.)

SAN FRANCISCO April, 15.

The following shows amount of ore extracted and battery assays of Comstock mines during the past week.

Mines.	Tons.	Assay value. April 11th.	Assay value. April 4th.
Con. Cal. and Virginia.	1,525	34·10	34·60
Chollar.....	520	20·00	20·49
Overman.....	809	14·77	15·81
Savage.....	424	15·60	17·10
Yellow Jacket.....	266	18·03	18·00

ALTA SILVER MINING COMPANY.—There is a strong chance of the powerful pumps of this company being started up within the next two weeks. If so they will be a powerful auxiliary to those in the Crown Point incline; since the operations for draining the Gold Hill group of mines were inaugurated the water in the Alta is said to have been lowered very considerably.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—The south drift on the 1,100 level, cut into fair-grade ore on the 10th inst. at a point 323 feet in. Since then the drift has been run ten feet, with the face in ore of good quality. This is some little distance from the point where it was expected ore would be found. This ore is in virgin ground. On the 1,500 level the width and quality of the ore exposed in the opening, 43 feet above the sill floor, continues to hold good and is expanding in the workings to the northeast and on the west side.

CROWN POINT MINING COMPANY.—The water in the incline has now been lowered several inches below the 1,700 foot station. The station appears to be in good condition, and, with the exception of the cleaning up to be done, no great trouble is anticipated in getting the pumps below the station.

OPHIR SILVER MINING COMPANY.—Considerable ore is being taken from the raise in the south drift, from the drift run west from the winze. The battery samples have averaged $24 per ton.

OVERMAN MINING COMPANY.—More than ordinary interest is being taken in this company's operations just now, and it is reported that there will be a contest at the next annual election, J. Flood opposing "Bob" Morrow who has had control for so long. From the 1,250 level up rich bunches of ore are found in every opening, but from inability to sort the ore the average output is of low grade. On the 1,000 level, between the north and south raises, the indications are considered good for a development towards the south. The average assay of ore taken from the 1,100 level, in the south raise, for 150 feet, was over $25 per ton, and it is improving as height is obtained. The present out put averages 140 tons per day.

YELLOW JACKET MINING COMPANY.—An assessment of 50 cents per share, aggregating $60,000, has been levied on the stock of this company. The last assessment was levied on March 28, 1889, that being the 46th call on stockholders who have been compelled to pay $5,503,000, in order that they might receive $2,184,000 in 25 dividends. The last dividend was declared in August, 1871, the mine having been worked at a loss (to the shareholders) ever since. The ore being extracted lately has proved to be the most extraordinary even rock, according to assay, ever, perhaps, encountered, for weeks the battery assays having been given out as $18 per ton.

NEW MEXICO.

GRANT COUNTY.

AZTEC MINING COMPANY.—This company's payroll now aggregates about $6,000 a month. Last week $2,000 worth of concentrates were produced.

SANTA FE COUNTY.

SANTA FE COPPER COMANY.—The Luhrig's Concentrator Company, of London, England, it is said, is forwarding to the Santa Fe mines a 10 ton concentrator at its own expense. The object is to introduce the machine in this country.

ST. LAZARUS GOLD MINING COMPANY.—This company was organized last November by Milwaukee, Wis., parties. A tunnel has been run 400 feet and the ore body reached. A tramway 1,000 feet long has been built and a mill erected. The officers of the company are as follows: President, F. C. Hanford; vice-president, J. H. Stover; secretary, J. L. Gates; treasurer, M. D. Newald; superintendent, S. P. Conger.

SIERRA COUNTY.

The new strike of ore at Lake Valley, outside of what is known as the company's grounds, has been talked of extensively for the past two weeks, and is undoubtedly a discovery of importance. A carload has already been shipped, with plenty more sacked on the dump ready to follow. The ore is very rich, carrying horn silver. The owners of the property prospected without result for two years, and then leased and bonded the mine to a third party, who struck the body of rich ore.

OREGON.

BAKER COUNTY.

ROBBINS.—Recent developments in this property have opened up a 10-foot ledge of what is reported to be rich ore on the 300-foot level. This mine has paid well ever since the shipment of ore for reduction began. Should this strike prove as important as at present supposed, a mill will probably be erected.

PENNSYLVANIA.

COAL.

The commission on the revision of mining laws, which has been in session for several weeks, has passed its report to a second reading. It is expected that this report will be made public during the coming week.

Advices from Pittsburg are to the effect that there is no sign of yielding on the part of the bituminous coal operators to the demand of the miners for the eight-hour day from May 1st. Unless the situation changes entirely within the next six days 75,000 skilled miners, and as many more mine laborers, will go into idleness. Of the miners who are expected to make this stand 25,000 are located in Pennsylvania, and twice that number in the coal fields of Ohio, West Virginia, Indiana and Illinois. The American Federation of Labor is back of the movement. The miners are united in making the demand, but the operators are not in harmony in resisting it. Already several of the western individual mine owners have agreed to the short day. Several in the Pennsylvania fields will make the concessions also, notably W. P. Rend, of Chicago, who operates mines near Pittsburg. The miners are paid by the ton and the laborers by the day, and it is upon the adjustment of day wages that the most difficulty will be met. In the Clearfield district the 15,000 miners will probably go out. It is the contest in this region that is said to be of paramount interest to manufacturers in the eastern part of Pennsylvania and in the vicinity of New York and Philadelphia. Later information states that the miners in the Upper Monongahela River region have decided not to strike for the eight-hour day on May 1st, when the general move is to be made by miners. The river miners, numbering 12,000, have just gone back to work, and are enjoying a prosperous run after a disastrous strike of several months. In addition to this they deny they are in one of the competitive districts ordered to strike.

ALDEN.—Fire caught in the engine station in the "C" vein slope of this colliery on the 21st inst., setting the gangway on fire. The air currents drew the flames into the mine. It is now being flooded. Over 400 employés are idle.

BLACK DIAMOND.—A cave occurred in this colliery, in Luzerne borough, on the 19th inst., which caused the settling of about six acres of ground above. Many buildings were damaged.

RELIANCE.—This colliery, at Mt. Carmel, after a long suspension, resumed work on the 20th inst.

IRON.

E. & G. BROOKE IRON COMPANY.—This company's mines at St. Peter's, which have been idle two years, will resume operations at once. The Temple Iron Company, after prospecting for several months on an adjoining tract, struck a rich deposit of ore at a depth of 150 feet.

UTAH.

BEAVER COUNTY.

HORN SILVER MINING COMPANY.—The production of this company, according to a local paper, at present aggregates 125 tons of ore of good grade per day, most of it coming from ground between the 800 and 900 levels. On the 800 level, the ore body is said to be showing 200 feet on the strike of the vein. A winze has been sunk to the 900 level through ore the whole way. On the 600 level a big body of ore is exposed also; it is being stoped all the way up to the 500, where it is about 30 feet wide. All of the ore is running high in lead and that in the lower levels high in copper. Work is being prosecuted in the old parts of the mine and some ore is being taken from the 100 and 300 levels. About 100 men are at present employed in the mine.

JUAB COUNTY.

Salt Lake and all the mining camps of Utah are now much excited over the discoveries of rich ore in the Deep Creek district in this county, and there is a rush of prospectors thither. The name of the new camp is Dugway, and there are said to be 100 miners at work there already. The first discovery was made by Sam Gilson, in the Buckhorn claim. A carload of ore from this property recently sampled in Salt Lake assayed 9½% lead, 604 ounces silver, and 3·8 ounces gold. Other properties being opened in the camp are the Silver King, in which a vein of great width has been traced for 1,500 feet; the Rattler, Bobtail, Mono No. 2, Ben Harrison, Minnie Moore and Virginia. All of the ore thus found in the district seems to carry lead. It is 100 miles from railways. The ore bodies are found in a wide contact vein lying between limestone and quartzite. The country for an area of one mile wide and six miles long is said to show much galena float. The district is in the northwestern part of this county, near the Nevada line.

BULLION-BECK AND CHAMPION MINING COMPANY.—The strike of the employés of this company concerning the boarding-house question lasted only a few days, the company granting the men the right to board where they pleased.

RED ROSE.—Ore has been struck by the shaft sinking on this property at a depth of 300 feet. The vein at this point is five feet in width, and apparently widening with depth. The ore assays about 15% lead and 200 ounces silver. The property belongs to William Groesbeck and brothers, of Salt Lake City.

SUMMIT COUNTY.

GLENCOE MINING COMPANY.—This company has made a contract for the erection of dressing works of 100 tons daily capacity, at once. The strike recently made in the Glencoe tunnel has proved to be a good one, and a large amount of ore has already been exposed.

TOOELE COUNTY.

BUCKHORN.—It is reported that large dressing works are to be erected at this property. A large amount of low-grade ore is said to be exposed in the mine.

WASHINGTON.

OKANOGAN COUNTY.

FIRST THOUGHT MINING COMPANY.—This company has been incorporated in San Francisco with a capital stock of $10,000,000, shares $5 each. The company owns the First Thought mine.

STEVENS COUNTY.

CAPITAL.—This iron mine has been sold to Tacoma and Seattle gentlemen for $3,000, and it is intended to develop the mine as rapidly as possible. Richard J. Davis has been placed in charge. A tunnel will be run to tap the main ledge, and this then used as the main working entrance of the mine. The Tacoma Smelting and Refining Company has contracted with Mr. Davis to take 20 tons of the ore weekly. The ore runs 56% iron, and has very superior fluxing qualities.

WEST VIRGINIA.

The coal operators of the Kanawha Valley met in Charleston last week and resolved to continue operations as before, without regard to the recently enacted laws to provide for the weighing and measuring of coal before it is screened, and to prevent the payment of operatives in anything else than lawful money. They claim the laws are unconstitutional, and will test them in the courts. On the other hand, the United Mine Workers, in convention, have demanded the enforcement of the laws.

FAYETTE COUNTY.

(From our Special Correspondent.)

GAULEY MOUNTAIN COAL COMPANY.—This company is reported to have purchased the 2,500 acres of mineral lands in this country, including th

property of Hawk's Nest Coal Company. The price paid is stated to have been $124,000.

PLEASANTS COUNTY.

A recent dispatch from Salama says that great excitement prevails in that neighborhood as a result of new oil discoveries. A well is being bored by Dr. Campbell and Captain Devries, of Wheeling, on Dr. Bartlett's Robin Run tract. The gas was struck at about 1,150 feet in sand and shales. They are still going deeper in expectation of getting oil. This well is about 40 rods south of another on Sylvester Sheets' tract, in which oil was struck about two weeks ago, and which is now flowing about 40 barrels per day. Almost within a stone's throw there is one well going down on Mr. Cochran's place and another on Mr. W. H. Sheets' property, while another rig up and machinery is being put in place as fast as possible on Sylvester Sheets' ground, and will be ready to begin boring at an early day. Two other locations on this property have been made more recently. It is feared the wells are being placed too close together. A well located on the Beeson farm is considered much in advance of present development and will be a test well.

WISCONSIN.

The Geo. P. Lee brown-stone property on Bank Island, Lake Superior, after an idleness of two years, has been leased for 10 years to Geo. H. Barr, of Superior, Wis., and F. C. Bailey, Milwaukee, Wis.

DOUGLAS COUNTY.

WEST SUPERIOR SMELTING AND REFINING COMPANY.—The original plans for the smelting works are reported to have been quadrupled. Two sixty-four-ton stocks will be put in. The company has acquired valuable dock property from the Land and River Improvement Company, and $500,000 will be expended during the current year upon smelting and refining plants. Ores can be secured in abundance and with lower freight charges than at St. Louis. There is said to be a saving of several dollars a ton on coke alone.

LAFAYETTE COUNTY.

(From an Occasional Correspondent.)

BLACK LEG.—Mr. Hardy, of Shullsburg has recently opened into a fine lead of "mineral" on his Black Leg property near White Oak Springs at the Illinois line. There are numerous ore-bearing crevices or "lodes" which here run nearly north and south and are intersected by another series trending east and west. These veins are known as "north and souths" and "east and wests." The formations are horizontal, and, owing to the enormous volumes of water found in the crevices and caverns, little or no work has been done below a depth of from 50 to 100 feet from the surface.

WYOMING.

CARBON COUNTY.

A stage line has been established between Carbon and Gold Hill. The time between the two places is eight hours.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

WEST KOOTANIE DIVISION.

(From our Special Correspondent.)

NELSON, B. C., April 13.

The steamer "Galena" left Bonner's Ferry for Nelson and Hot Springs on the 30th ult. for the first time this year, and ever since her arrival much activity has been apparent in both camps.

The provincial government also is doing much to help forward the district; it has appointed a committee to devise ways and means to promote the rapid development of the dormant mineral resources of the country. It has appropriated $36,000 towards the construction of trails, wagon roads, and bridges in the West Kootanie division, $8,000 of which is to be used in finishing the wagon road to the Silver King and other Toad Mountain mines a few miles south of Nelson. It has repealed the 5% royalty clause in the "Act in Aid of Certain Railways" (see ENGINEERING AND MINING JOURNAL, Sept. 20th, 1890); it has granted charters for a railway from Fort Sheppard, on the Columbia River, to Nelson, and for one through the Crow's Nest Pass to the same destination; and lastly, it has, through the premier, stated "that it is their policy and earnest desire to promote the erection of such reduction works as will enable our ores to be treated in the province, and any sound and meritorious scheme having that object in view and seeking a subsidy either in land or money shall receive their best consideration."

Forces of men are still at work on the Sproat-Nelson railway, and the road is now graded to within two miles of Nelson. A still larger number of men are engaged on the portion of the Great Northern line between Kootenai, Idaho and Bonner's Ferry on the Kootanie River.

HOT SPRINGS DISTRICT.

COLUMBIA-AMERICAN MINING COMPANY.—This company has been organized with the following officers: President, B. C. Van Houten; vice-president, W. H. Lynch; secretary, F. E. Archer; treasurer, B. C. Van Houten. It is to work the "Kismet" and other claims.

PACIFIC BULLION MINING COMPANY.—The election of officers took place recently, and it was stated that the company would expend $15,000 in developing its property in this camp during the present year. Last year its promises were not fulfilled.

TENDERFOOT.—The shaft is down over 60 feet, with good ore at the bottom.

UNION.—Work has been stopped on the Union shaft at a depth of 90 feet, owing to the influx of water.

UNITED.—The two-compartment shaft is down 115 feet. Repairs are now being made to the pumping plant, and the drifts from the 50-foot station are being extended. The north drift has been run 70 feet, and the south one nearly 60 feet. The ore is said to be of a uniformly good grade.

NELSON DISTRICT.

IROQUOIS.—This claim, located within 600 feet of the Silver King, but upon a distinct, though parallel lead, has been sold to J. E. Boss, of Spokane Falls, for $25,000 cash. Mr. Boss rode in from Marcus ahead of the first steamboat, and thus secured the bargain; for other mining men were determined to bid considerably higher for the property. (See ENGINEERING AND MINING JOURNAL, August 2d, 1890.)

JIM CROW.—$5,000 was refused for this undeveloped property two weeks ago.

ROYAL CANADIAN.—The owners have been at work through the winter and have extended their lower tunnel 72 feet. The vein, which varied in width from 18 inches to 4 feet, has within the last 8 feet pinched to 6 inches.

WHITEWATER.—A one-half interest in this claim was sold on February 4th to W. J. Goepel, of Victoria, for $10,000, $2,500 of the same being cash, $2,500 in six months, and the balance in nine months. Eight men are now building a new trail to the property, and the Huntington mill—now idle on the Cottonwood gold claims—will be transported as soon as possible. A 1½-ton shipment of the ore to the Revelstoke smelter last fall yielded $110 gold and $9 silver per ton. The claim is about 18 miles southwest of Nelson.

CANADA.

PROVINCE OF ONTARIO.

MURILLO.—Active operations are being carried on at this mine. Fourteen men besides the superintendent and assayer are now employed. The vein is steadily widening. The first drift will be put in 60 feet down in the shaft, and if this turns out well another will be driven in at 120 feet. The walls show galena, and the indications are said to be very good.

MEXICO.

SONORA.

(From our Special Correspondent.)

SAN LUIS MINING AND REDUCTION COMPANY.—This company is erecting a lixiviation plant at its mines in the Montezuma mining district, and is hauling from 200 to 300 tons of machinery from the railroad at Tombstone, Ariz., and other points for that purpose. The leaching machinery to be erected is from the works of Fraser & Chalmers, and it is hoped to have the plant in operation at an early day. The ore handled so far has shown from 100 to 450 ounces of silver per ton, and from tests seems to be well adapted to the lixiviation process.

SOUTH AFRICA.

The production of the Witwatersrand mines during February, according to the official figures of the Chamber of Mines, was 50,079 ounces gold, valued at £171,727. One thousand three hundred and fifty stamps were in operation and 75,167 tons of ore milled, the average time of milling being 22·71 days.

MEETINGS.

Bloomington Coal and Coke Company, at the office of the company, in Philadelphia, Penna., June 4, at 12 o'clock noon.

Columbus & Hocking Coal and Iron Company at the office of the company, in Columbus, Ohio, May 20, at 10 A. M.

Church Gold Mining Company, at the office of the company, Room 11. No. 303 California street, San Francisco, Cal., May 4th, at 1.30 P. M.

Diana Gold and Silver Mining Company, at the office of the company, No. 331 Pine street, San Francisco, Cal., May 5th, at 2 P. M.

Glendon Iron Company, at the office of the company, in Boston, Mass., May 6, at 12 o'clock noon.

Iron Silver Mining Company, at the office of the company, No. 15, Broad Street, New York, May 5, at 12 o'clock noon.

Louisiana & Alabama Coal and Iron Company, at the office of the company, in New Orleans, La., April 27, at 7.30 P. M.

Morgan Mining Company, at the office of the company, Room B, No. 230 Montgomery street, San Francisco, Cal., May 2d, at 11.30 A. M.

Ruby Iron Mining Company, at the office of the company, in Cleveland, Ohio, April 30, at 11 A. M.

St. Bernard Coal Company, at the office of the company, in Earlington, Ky., May 6, at 12 o'clock, noon.

DIVIDENDS.

Alabama Coal and Iron Company, dividend of two per cent payable May 12, at the office of W. S. Gurney, Jr., & Co., No. 80 Broadway, New York City.

Boston and Montana Consolidated Copper and Silver Mining Company, dividend No. 12 of $1.00 per share, $125,000 payable May 20 at the office of the company in Boston, Mass. Transfer books close April, 27 and re-open May 2.

Champion Mining Company paid dividend No. 12, of 10 cents per share, $10,000, April 20, at the office of the company, Room 10, No. 320 Sansome street, San Francisco, Cal.

Comstock Tunnel Company, coupon No. 3, due May 1st, will be paid on and after that date at the office of the company, No. 115 Broadway, New York City.

Glengary Mining Company, dividend No. 1, of five cents per share, $5,000 payable April 25, at the office of the company in Butte, Montana.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of sale.	Amn't per share.
Alpha, Nev	6	Mar. 14	Apr. 17	May 7	.25
Andes, Nev	37	Apr. 4	May 8	May 28	.30
Big Hole Placer, Ut.	....	Mar. 10	Apl. 22	May 12	.01
Chollar, Nev	29	Apr. 3	May 12	June 2	.50
Cons. New York, Nev	5	Apr 3	May 8	May 9	.15
Cosmopolitan, Nev.	6	Feb. 24	Apr. 7	Apr. 29	.10
Guscaran & Cal., C. A.	4	Mar. 10	Apr. 15	May 4	5.00
Hale & Norcross, Nev	99	Mar. 17	Apr. 22	May 14	.50
Kentuckee, Nev	1	Mar. 31	May 5	May 26	.20
Lady Washington	8	Mar. 3	Apr. 7	Apr. 28	.20
Mexican, Nev	42	Mar. 9	Apr. 14	May 5	.25
Nevada Queen, Nev	7	Mar. 4	Apr. 10	Apr. 30	.15
Scorpion, Nev	2	Apr. 14	May 22	June 15	.10
Silver King, Ariz	5	Feb. 21	Mar. 30	Apr. 28	.20
Teresa, Mex	3	Mar. 28	May 1	May 19	.10

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 511 and 512.

NEW YORK, Friday Evening, April 24.

Once more we are compelled to chronicle a somewhat depressed condition of the mining stock market. The bottom has not by any means dropped out of stocks, for prices as a rule have not undergone any marked decline. There is simply a lack of inclination to make investments. The feeling can be described as one of both indifference and uncertainty as to the future. The Comstocks which have grown to be something of an Exchange barometer, have all shown offish tendencies, doubtless imparted to them by San Francisco stock manipulation. They made very few sales during the week and these at lower quotations. There was a quiet inquiry for Colorado stocks. It was instrumental in bringing about a fair number of sales at prices well maintained. Among the features of the week was the sharp advance in Horn Silver, the activity of Phœnix, and the evident desire of some one to gather in a few shares in the Black Hills properties, all of which are treated elsewhere in this report. The sales for the week were 49,828 shares, of which 10,193 were dividend paying. The sales for the corresponding week of last year were 98,932 shares.

Of the Comstock Consolidated California and Virginia, which closed a quiet week April 17th at $13.75, opened on Monday at $13.63. On sales of a few shares the price rapidly declined until the figure of $12.38 was reached yesterday. The quotation received to-day from the San Francisco Exchange was $12.61. A lot of 100 shares of Crown Point sold on Saturday at $2.90 as against the closing of $2.50. It did not appear in the market during the balance of the week. Ophir suffered a marked reaction. The quotation on two small sales being $7.50 as against $8.25, the closing of the week previous. Yellow Jacket opened at $3.20 as against the closing of $2.90. On Tuesday it sold at $2.75, its last quotation. Alta received one sale of 100 shares at $1.15, on Wednesday. Best & Belcher was quite active on small sales. It opened at $7.88, declined to $6.63, rallied and closed at $7.50, a loss of 50c. in the week's transactions. Bullion entered the market on Saturday at $2.60, selling 100 shares. It did not receive a second quotation. Chollar on Saturday sold at $3.30, on Monday at $3.05. Comstock Tunnel did not enjoy its usual activity, although it manifested considerable strength. It received but one quotation during the week, it being 21c. on sales of 7,500 shares. Neither the bonds nor the scrip were called during the week. It is an occurrence which has not happened since the recent advance in Comstocks. Mexican sold 100 shares yesterday at $4.50, as against $4.25 the week previous. Occidental maintained its average quotation of $1.25 on light sales. Potosi developed considerable strength on a few sales experienced during the early part of the week. It opened at $5.13, and on Monday dropped off to $4.90, after which it left the market, having made a gain of 15c. over quotation of April 15th. Scorpion sold 1,200 shares on Saturday at 55c., a net gain of 3c. Seg. Belcher was in the market Saturday to the

extent of 200 shares at $1.60, a loss of 10c. Union Consolidated entered the market strong at $4.25, gradually dropping until $4 was reached; the same being the closing price of lest week.

Of the Colorado stocks, Chrysolite sold 250 shares at 24c., its average quotation. Leadville Consolidated was moderately active at 12c., 10c. and 11c., the latter being the closing, as against the closing of 12c. of the previous week. Little Chief sold a lot of 100 shares at 32c., a loss of 1c. Robinson Consolidated continues in demand at 40c.@45c. It seemed to be going in one direction and in small lots. Monitor, which sold last on February 9th at 5c., sold 800 shares during the week at 4c. and 5c.

Of the California stocks we note quite an activity in Astoria during the early part of the week; 3c. was the quotation on Saturday and Monday, falling off to 1c. on Tuesday, at which time the stock disappeared from the board. Belmont manifested its usual strength, selling as high as 45c., as against a maximum quotation of 44c. of the previous week. Brunswick was somewhat stronger than it has been for two weeks past. Its only quotation was 10c. on sales of 2,000 shares. Middle Bar was quite active during the week; 3,000 shares sold at 3c.

In the copper stocks a small lot of Calumet & Hecla sold on Wednesday at $259.50. Allouez sold 50 shares at $3.63, a much stronger quotation than was made on the Boston board last week. A holder, evidently desiring to realize on 200 shares of Huron, sold out at $2.78.

There was little movement during the week in South Dakota stocks. Caledonia, which closed unsteady at 73c. last week, opened at 72c., and on Wednesday sold at 85c. There seems to be no disposition on the part of insiders to furnish any tangible news concerning this property. Deadwood-Terra, its near neighbor, sold 100 shares at $1.25, as against $1, the quotation last received February 21st. Father de Smet was eagerly sought after; 43c. and 45c. brought out 600 shares on Saturday.

Alice was quite active during the week, selling as high as $1.80 and as low as $1.60. When last quoted, March 26th, it sold at $1.75.

Holyoke, of Idaho, seems to be the foot ball of the Exchange during the week. In odd moments—and there were lots of them—the brokers amused themselves by trading in the stock at 3c. There were a large number of sales made which did not aggregate more than 500 shares.

Horn Silver was one of the strong stocks of the week. It was in great demand and calls brought out 2,680 shares at prices ranging from $3.50 to $3.60, the latter being the closing. We have it from good authority that a Wall street banking concern has received orders to buy all this stock that is available under a certain figure. The manner in which the price has risen is evidence of the truth of the statement.

Phœnix, of Arizona, was one of the active stocks of the week. It opened on Monday at 45c. and 55c., rose to 56c. the day following, and closed yesterday at 54c., as against 45c. of the previous week; 6,000 shares changed hands.

Castle Creek, of Idaho, sold 400 shares on Wednesday at 3c. El Cristo of South America was decidedly off in the face of a dull market. On Tuesday it sold at 40c., and on Wednesday at 37c., the latter being the closing; 56c. was the highest point reached last week. Mutual Smelting and Mining opened Monday at $1,50, and sold off to $1.35 on Wednesday. Inasmuch as it has always been an active stock, it is not easy to strike an average quotation from the week's transactions. Rappahannock, of Virginia, sold 2,000 shares to-day at 2c. Silver Hill, of Nevada, sold as high as 32c. and 35c. on Monday.

Boston.

April 23.

(From our Special Correspondent.)

Dullness seems to be the predominant feature in the copper stock market, and prices are inclined to a lower level, hardly a stock on the list showing an advance. It is worthy of mention, however, that the dividend-paying stocks are selling at about the same prices as in April, 1890. Calumet & Hecla sold at $260@$262½ for a small lot. Quincy declined to 104, with a rally to 105½ later.

Tamarack declined to $148, and is very firm at that price.

Boston & Montana declined from $433¾ to $41½. The company has declared the usual quarterly dividend of $1 per share, making $1,825,000 paid to date.

Butte & Boston has held very steady at $15½@$15¾.

Osceola has been unusually dull this week, but quite steady at $36.

Franklin is firm at $17. There was only one sale of 10) during the week.

Centennial was steady at $15¾@$16⅛, and Kearsarge dull and inactive at$13½@$14.

Atlantic sold at 15½, a decline of ½ from last sale.

Allouez made one sale only during the past week, this being at $3⅛.

Arnold sold at 55c., assessment paid, and National at $3.

Santa Fe has been quite active at 60@62½c., on report that the company was considering the question of adding a 300-ton concentrator to its plant.

Silver stocks are rather more active. Dunkin sold at 65c. Napa Quicksilver advanced from $4 to $5, with later sales at $4¾. Breece sold at 40c., Catalpa at 20c. and Crescent at 10c.

3 P. M.—The market this afternoon was fairly strong. Tamarack sold at $150 and Boston & Montana advanced to $42½.

NOTES OF THE WEEK.

The Boston Stock Exchange on the 20th inst. established its quarters in the second largest office building in the United States, the same being an eleven-story structure occupying an area of 33,300 square feet, located on State street. Its cost is said to have been $4,000,000. The Exchange has a 10-year lease of a 51 × 100 foot stock room, a 22 × 40 foot board room, and auxiliary apartments.

Chicago.

The Chicago Metal, Mining and Stock Exchange will open on Tuesday, the 28th inst. It has secured a fine large room in the Grand Pacific Hotel, facing Jackson street and the Board of Trade. This is an institution of which this city has been in need for some time, and the outlook is very favorable for it being a success.

Denver.

Prices and sales for the week ending April 18th, 1891:

Company. Mines.	Opening.	H.	L.	Closing.	Sales.
Alleghany	15½b	15	15	15	100
Amity	05¼	*05¾	05¼	05½	16,600
Bangkok-C.-B.	08½	*09½	08½	09¼	30,200
Bates-Hunter	70b	70	70	70	100
Brownlow	07¾	08¼	07½	07¼	8,600
Calliope	17¾b	20	20	18¼	200
Cash	12b	...	....	12	.....
Clay County	108b	109	109	109	800
Leavenworth	19b	18½	18½	18¼	100
Little Rule	108b	*112	108	108	700
Matchless		275	275	225	500
May-Mazeppa	120b	†125	120	120	1,700
Oro		....	....	30¼	.....
Pay Rock	03b	03¼	03	03	2,600
Puzzler	07¼b	07½	‡07	07	17,200
Reed National	68a	....	....	55	.....
Running Lode	21b	*27	24¼	25	9,200
Whale	....	....	....	....	.....
Bal. Smuggler	108a	*92	66	*91	1,800
Rialto	...	91	90	87	600
Prospects.					
Argonaut	16b	....	....	16	.....
Big Indian	09¾b	*10	*10	09½	100
Big Six	17½	*19	16	16½	16,600
Century	26b	26	25	25	300
Claudia J	07½b	*08¼	07	07	4,300
Nat. G. & Oil Co.	15b	15½	13	13	4,000
Diamond B	09¼	*10¾	06¼	09	174,800
Emmons	*17	*47½	44½	45	8,900
Golden Treas	32b	†37	34	34	5,100
Ironclad	05¾b	06	05¼	05¼	5,500
John Jay	09½b	09½	08¼	08	8,200
Justice	13b	15	13¼	13¼	4,100
Legal Tender	05½b	07½	06	06¾	47,700
Morning Glim	....	....	....	45	.....
Park Consolidated	18b	†20	18	18½	1,000
Potosi	08	09½	08	09	7,400
Total					380,000

* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked b Bid.

San Francisco.

April 16.

(From our Special Correspondent.)

The volume of trade done in mining stocks during the current week has been so large that Pine street has for the nonce had the lively experience of some eight or ten years ago revived. Last week prices shaded off on Friday and Saturday despite favorable news from the mines. It was known that the south drift, 1,100 level, in the Consolidated California and Virginia mine had cut the continuation of ore found on the 1,200 level and the possibility of it passing into a large body of ore was recognized, but notwithstanding this the week closed with a rather heavy market and prices tending to weakness.

With a fuller knowledge of what had been done on the Comstocks and the battery assay value of the ore extracted the stock market opened quietly on Monday but with a perceptible strengthening in prices. On Tuesday business was rushing and has continued so until to-day. Large orders have been received from Virginia City, and strong hands here are also helping things along.

While Consolidated California and Virginia stock gained 50 cents on Monday and sold to $14.50 the day following, about which figure it has fluctuated, until this morning, it sold to $14 62½, the main strength of the market has centered in Hale & Norcross. A reported strike close to the Chollar line has been the ostensible reason for the heavy sales and the sharp advance, but Chollar has not shown the activity it ought to have done in that case. On Monday Hale & Norcross sold for $2.30, an advance of 15 cents on Saturday's ruling rate; rose to $3.20 on Tuesday, and had a further advance yesterday to $4.35, declining before the close, however. This morning it opened at $4.05 and recovered to $4.15. Yesterday the sales of this stock aggregated, in regular session, between 8,000 and 9,000 shares. The other middle stocks have not been in such active demand, but Savage, which during each rally in the market has been among the last to move, has advanced from $2 85 on Monday to $3.55 this morning, with sales moderate.

Best & Belcher continues to receive considerable attention, and advanced from $6.50, the highest figure on Saturday, to $6.87½ on Monday, jumping to $8 on Tuesday, with large sales. Since then it has been ruling at $7.87½, a decline of from two to three points being noted this morning.

Ophir has maintained a more even position, perhaps, than any stock on the list; selling to $6.37½ on Monday, it rose to $8.12½ the day following, and has ruled at that figure since with very slight fluctuations.

The Gold Hill group of stocks have, comparatively speaking, been neglected, with the exception of Overman, which has sold freely. The idea abroad that a contest will take place at the annual election for control of the mine is causing the stock to be closely watched, although since the sharp, but temporary advance over a week ago, there has been no exceptional movement. A week ago the stock was quoted at $4.05, and is ruling to-day at $3.80, and yet the tendency during the week has been to advance, for on Saturday last the stock had declined to $3.65.

In the outside group of miscellaneous stocks little business has been doing. The "wild cats" are being regularly called again this week and, unfortunately, some sales were made.

By Telegraph.—The quotations at 10 A. M. Friday, the 17th inst., were as follows: Alta, $1.15; Best & Belcher, $6.75; Belle Isle, 65c.; Brodie, $1.25; Bulwer, 40c.; Consolidated California & Virginia, $12⅝; Challar, $2.90; Crown Point, $2.50; Commonwealth, 80c.; Eureka Consolidated, $3.75; Gould & Curry, $3.20; Hale & Norcross, $3.30; Mexican, $3.95; Mono, 65c.; Navajo, 30c.; North Belle Isle, 85c.; Nevada Queen, 55c.; Ophir, $6⅝; Potosi, $4.40; Savage, $3.25; Sierra Nevada, $3.15; Union Consolidated, $3.70; Utah, $1.10; Yellow Jacket, $2.70.

Salt Lake City.

PRICES AND SALES FOR THE WEEK ENDING APRIL 18, 1891.

Name and Location of Company.	Opening.	Highest.	Lowest.	Closing.	Sales.
Alice, Mont	1.60	1.70	1.60	1.65	....
Alliance, Utah	....	....	....	....	....
Anchor, Utah	6.55	6.55	6.50	6.55	....
Apex, Utah	.10½	.11	.10½	.10	6,000
Barnes Sulphur, Utah	.01	.01	.01	.01	....
Big Hole Placer, Mont.	.07	.08½	.05	.05	3,000
Centen'l Eureka, Utah	....	....	....	....	....
Congo, Utah	.20	.20	.18	.16	5,000
Crescent, Utah	.32	33	.29	.30	810
Daly, Utah	18.75	18.77½	18.50	18.50	....
Glencoe, Utah	....	....	....	....	....
Horn Silver, Utah	3.20	3.20	3.15	3.15	....
Malad Con., Idaho	.02	.02	.01½	.01¼	9,800
Mammoth, Utah	3.75	3.80	3.40	3.60	2,100
Northern Spy, Utah	1.50	1.50	1.25	1.50	....
Ontario, Utah	....	....	....	....	....
Stanley, Utah	.16½	.17	.15	.16	500
Utah S. & C. Co.	....	....	....	....	....
Utah Oil Co., Utah	....	....	....	....	....
Woodside, Utah	....	....	....	....	....
Total sales					27,21

St. Louis.

April 22.

(From our Special Correspondent.)

The market was more active during past week than for some time. Trading was carried on more largely, and prices on the whole improved. As usual, there were two or three booms, and Elizabeth and Mickey Breen managed to receive full benefit from them. Bi-metallic fell off a little and Granite Mountain remained about the same.

What attracted most attention was the sudden rise in Elizabeth. On the opening call the stock was bid at $1.75, rose to $1.95, where sales were made, and then to $2.25. On Saturday it fell back to $2.07½, with 50 shares sold. Monday the stock was quoted as high as $2.22½, but, so soon as it became known that a telegram had been received reporting a strike, the market went wild, and the stock rapidly sold up to $2.70. On Tuesday the stock opened at $3, and continued to sell at that price for some time, falling in the end, however, to $2.57½. During the week 13,450 shares were sold, of which over 5,000 changed hands during the boom. The market closes to day at $2.45.

Breen was another stock to have a boom, and went up several points. The market opened at $1.10, rose to $1.35, but fell to $1.12½, up again to $1.30, then fell to $1.25, and finally rose to $1.32½ when after some stock had been sold the market, again fell off. About 4,000 shares were sold altogether. The market closes firm at $1.30.

Granite Mountain remains inactive despite the good news received from the mines, and not a sale was made during the week. There was little or no bidding on the stock. The market opened at $26, fell to $25.50, and later to $25. The regular shipments amounted to 45 bars, containing 61,650 ounces of silver and 98 ounces of gold.

Bi-metallic had a sale of 50 shares at $34, but the market was poor during the whole week, and fell off somewhat. The stock opened at $34.50 and closed at $33.50.

Adams opened at $1.85, with sales amounting to 500 shares; soon after, the market fell to $1.80, and to-day is quoted at $1.75.

Nellie had a sale of 100 shares at 11c.; the stock is now bid at 10c.

Yuma sold at 80c. at the opening, but soon after fell to 60c. On Saturday 65c. was bid, and to-day the stock is quoted at 68¾c. One sale of 500 shares at 80c. represents the week's business.

Eight hundred shares of Gold King sold at 10c.; the market is very quiet, however.

Little Albert remains at the opening quotation of 10c. The market was very active and the stock in demand, 5,200 shares selling at 10½@12c.

American & Nettie improved considerably, and

from an opening of 28¾c. is now bid at 33¾c. At one time it reached 46¼c. Sales were 900 shares, at 32½@36¼c.

Central Silver remains at 3c. The market was poorer this week than it has been for months, only 300 shares selling at 3c.

Silver Age sold at $2.07½, 100 shares going at that price. The stock opened at $2.02½, on Saturday reached $2.10 and closed to-day, at $2.

One hundred shares of Montrose sold at 70c. The stock is now quoted at 67½c., 2½c. under opening price.

Lake Superior Iron Stocks.

(Special Report by A. M. Helmer, Milwaukee, Wis.)

IRON STOCKS.

Ashland	$57.00	American	$2.00
Aurora	8.75	Cleveland	16.75
Anvil	3.25	Vermillion P. I. & L. Co	2.25
Brotherton	2.90	Jackson	110.00
Germania	9.00	Lake Superior	62.00
Gogebic Iron Syndicate	.40	Milwaukee Iron Co.	5.00
Bessemer Consol Bonds	20%	East New York	1.75
Inter-Ocean	.30	Pittsburg & Lake Angeline	150.00
Great Northern Iron & Steel Co.	1.00	Republic	27.50
Iron Belt		Illonois Steel Co.	85.00
Montreal	11.25	River Side	2.25
Metropolitan	60.00	Chandler	38.00
Northern Chief	35.00	Chicago & Minnesota Ore Co	115.00
Odanah	14.00	Minnesota Iron Co.	74.50
Pence	1.75	Vermillion	.30
Clingstone	.25	MISCELLANEOUS:	
Ryan	.50	Ropes Gold and Silver Mining Co.	1.10
Sec. 33	16.00	Michigan Gold Mining Co	.45
Champion	78.00	Badger Silver Mining Co.	
*Wisconsin Iron and Steel Co.			

*Formerly Pence & Snider Co.

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. Watson & Gibson.)

The petroleum market during the week has been lower for Pennsylvania certificates, and higher for Ohio oil, the shrewdest operators deeming the latter relatively much cheaper than the former. Trading, however, is very limited though a revival of speculation in Ohio oil is not improbable.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
April 18	70⅝	70⅝	69¾	70	7,000
20	70	70	68⅝	68¾	10,000
21	68¼	68⅝	68	68⅝	6,000
22	68⅝	68⅝	68⅛	68⅝	2,000
23	69	70	69	69⅝	18,000
24	68⅞	69	68⅞	69	13,000
Total sales in barrels					56,000

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
April 18	....	....	....	....	.....
20	....	....	....	....	.....
21	....	....	....	....	.....
22	68½	69	68½	69	23,000
23	69¾	69¾	69⅛	69½	10,000
24	69⅞	69⅞	69⅝	69⅝	5,000
Total sales in barrels					38,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 24.

STATEMENT of shipments of anthracite coal (approximated) for the ten days ending April 18th, 1891, compared with corresponding period last year.

Regions.	Apr 18, 1891.	Apr. 19, 1890.	Difference.	
Wyoming Region. Tons	325,677	323,509	Inc.	2,168
Lehigh Region "	87,632	123,712	Dec.	36,080
Schuylkill Region "	180,612	180,489	Inc.	123
Total Tons	593,921	627,710	Dec.	33,789
Total for year to date Tons	9,653,592	7,913,919	Inc.	1,739,673

PRODUCTION OF BITUMINOUS COAL for week ending April 18th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1891. Week.	1891. Year.	1890. Year.
Phila. & Erie R.R.	1,367	40,279	36,977
Cumberland, Md.	†81,866	1,284,266	1,126,196
Barclay, Pa.	*3,304	51,990	43,090
Broad Top, Pa.	9,120	176,946	166,143
Clearfield, Pa.	85,114	1,326,317	1,221,851
Allegheny, Pa.	27,583	425,595	437,113
Beach Creek, Pa.	*10,128	691,891	582,159
Pocahontas Flat Top	59,254	706,479	555,675
Kanawha, W. Va.	†47,429	672,411	637,069
Total	355,165	5,376,174	4,806,273

* Estimated.
† Week ending April 14th.

WESTERN SHIPMENTS.

Pittsburg, Pa.	19,554	269,072	282,798
Westmoreland, Pa.	42,511	611,867	546,572
Monongahela, Pa.	14,936	167,606	72,533
Total	77,001	1,048,545	901,903
Grand total	432,166	6,424,719	5,708,176

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending April 18th, 1891, and year from January 1st, in tons of 2,000 lbs.: Week, 39,470 tons; year, 883,015 tons; to corresponding date in 1890—1,762,850.

Anthracite.

The week, ending April 18th, was a record breaker in the line of restriction. The output was 593,921 tons, a decrease of 33,789 tons over the corresponding period in 1890. The output for the year to date was 9,653,592 tons, an increase of 1,739,673 tons.

The Lehigh Valley Railroad Company has taken no notice of the mandate of the Interstate Commerce Commission to reduce tolls on Coxe Bros. & Co.'s shipments on and after April 20th. In an interview with Coxe Bros. & Co. we learn that the first official notice, which that firm will be apt to receive, that the railroad company does not intend to comply with the order, will be the freight bills for the week ending the 25th inst., which will be presented on the 27th or 28th inst. Coxe Bros. & Co. will pay these charges under protest and then sue in a United States court for a rebate. This action will virtually retry the case.

The sales agents of the Eastern and Western trades held meetings on the 21st inst. The Western prices were fixed as follows: At Buffalo and the bridges, on cars, $4.15 for grate; $4.25 for stove, egg and chestnut, per gross ton; for f o b 30c. additional. At Chicago the rate is $5.25 per net ton all sizes.

The Eastern sales agents fixed the allotment for May at 2,500,000 tons. This is the same tonnage fixed for May, 1890. The April circular of prices was continued. This affords the agents an opportunity to raise rates at any time during the month without recinding a previous action. The policy of restriction which has done so much for the trade was rigidly advocated, and proofs given that it was being honestly followed. Prices are being well maintained with very little talk of rate cutting. One prominent sales agent may be quoted as having said: "Prices are as well maintained by the companies, and there is as little complaint as I have ever known in the business."

As will be seen by the accompanying tables, restriction is going on vigorously. The Lehigh Company is working on an average of two days per week, and other companies about the same number. In the face of a shortage of stock among the retailers and consumers, and a belief that there is to be a harmony of action among the producers, which means one ruling price, the trade is commencing to respond with orders. There seems to be every indication that it is settling down to a good summer business. The operators are growing quite optimistic in the face of present conditions, and all are looking for lively times a month hence.

Bituminous.

There is manifest, at this writing, quite a decided improvement in the soft coal trade. The buyer, who has been holding off under the belief that the Seaboard Association would not live, that the advance in tariff rates would not hold, and that coal must sell at his own figure, has awakened from his day dream to a realization of the stern reality presented by higher prices and a depleted stock. He has been brought to this conclusion through the unbroken front maintained behind the Seaboard circular of prices, and the promise of a strike in certain of the producing districts May 1st. Out of a dozen representative firms visited this week, three-quarters stated that the trade was good, that contracts were well up to last year's mark, that the demand was increasing, and that the future was most promising. To be sure this movement of progression is small yet, but it seems to be strengthening. In the face of these conditions there is hardly a rumor of rate cutting. On the contrary there is considerable talk in certain quarters of putting up prices 10 cents and 15 cents. Stocks are moving so freely as to preclude a grumble even from the chronic kicker. The probability of a strike on May 1st is the general topic of interest now. The operators of the Clearfield region are making preparations to meet labor difficulties. They say that their men seem satisfied with their condition, but that they will doubtless be prevailed upon to strike by outside influences. They do not anticipate a very long or bitter struggle. The Cumberland operators are of the belief that a strike among their operators is not a probability, although, if the movement becomes general, they do not expect to escape. In the Pocahontas region there seems to be little or no probability of a strike. The trade takes the pessimistic view of matters, and, as a consequence, is starting to stock up. With these stocks on hand, a strike of short duration in the Clearfield district would not effect the price of coal.

The Connellsville strikers were practically beaten over a week ago, but matters are not yet quiet there. Evictions have been going on at the Frick Company's plants during the week and have resulted in a number of bloody riots, to quell which the militia and sheriff's posse have had to be called out.

The local trade is brisk. Prices are quoted $3.10@$3.15 f. o. b. Amboys, although certain of the best coals now command about 10c. above these rates. Freights are light in consequence of an abundant supply of vessels at lower ports. We quote: Philadelphia, to Boston, Salem and Portland, 80@85c.; to Sound ports, 75c.; Baltimore to Boston, Salem and Portland, 95c.; to Sound ports, 85c.

NOTES OF THE WEEK.

Western railroads burning bituminous coal are said to be accumulating stocks in contemplation of a strike.

Three hundred coal heavers employed on the docks at Cleveland, O., have struck for an increase of wages. They have received 10 cents per ton this season, and want 13 cents, which they were paid last year.

It is rumored at Mobile, Ala., that the recent improvements in railroad terminal facilities and the erection of coal elevators in that city is but the beginning of improvements looking to a large export coal business to Aspinwall. The East Tennessee railway system is the one directly interested.

The New York Retail Coal Exchange held one of its semi-monthly meetings on the 17th inst. for the transaction of local business. The Excursion Committee has been announced as follows: Brooklyn Exchange: Messrs. Bacon, Colyer, Greason and Kelsey; New York Exchange; Messrs. Davis, Ehrenreich, Haaren, Lathrop, and Mott.

There is said to be considerable Clearfield and Cumberland coal going into Cuba to the exclusion of the English product. At this season of the year imports from the West Indies are large, and the coal is being used in the place of ballast. The tonnage, which is going forward, is said to be larger than ever before. On account of its importance it is worth looking after.

The Central building of the Jersey Central Railroad Company, corner of West and Liberty streets is ready for occupancy. The Lehigh & Wilkes-Barre Coal Company occupies a very delightful suite of rooms on the seventh floor, overlooking the river. Among the other coal companies which have taken up, or are soon to take up, their quarters in the building, we note F. A. Potts & Co., Coxe Bro. & Co., Lehigh Coal and Navigation Company and E. A. Packer & Co.

Boston.

April 23.

(From our Special Correspondent.)

The market for anthracite coal continues quiet. Agents speak of the situation as being firmer, but buyers cannot see it in this light. They are keeping out of the market and say they will be ready to commence operating again when prices have reached bottom. They are confident that they will, in a short time, be able to buy at a much lower figure; agents, on the other hand, say that prices are as low as they will be, and further add that the conditions of the market will assist them in holding to the present figure. Coal is coming along at a good, steady rate, but this is being cared for by the existing demand. Broken sizes have been a trifle short during the past week, while most other kinds offered freely. The circular price is being adhered to strictly by all the leading agents, who are leaving time to settle the problem.

Very few remarks can be made on the bituminous situation, which is exactly as reported last week. Agents are busy hunting down the contracts which have not come to light yet. Those who are holding off are in a position to do so, having in some cases stocks to carry them into June. It is very probable that the end of this month will finish the contracts. Several of the largest contractors have been out for bids, but as yet none have been awarded. Buyers are not willing to deal at $2.40, the market price, expecting to do considerably better by waiting.

Freights are ruling fairly steady. Some few vessels of desirable size have been obtaining outside figures, but the market tone is really unchanged. From New York 50@60c. is quoted; from Philadelphia 90c., and from Baltimore $1@$1.10.

The retail demand is very small. The dealers have moderate stocks on hand and are not buying. The prices are holding steady.

The receipts at this port for the week ending April 18th were 28,241 tons of anthracite and 23,228 tons of bituminous, against 39,763 tons of anthracite and 21,836 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 372,414 tons of anthracite and 389,885 tons of bituminous, against 303,286 tons of anthracite and 273,600 tons of bituminous for the same time last year.

Buffalo.

April 23.

(From our Special Correspondent.)

The Erie, the Champlain, the Black River, the Oswego, the Cayuga, and the Seneca canals will be opened for navigation on Tuesday, May 5th.

Vessels are passing the Straits of Mackinaw; the Chicago grain fleet is on its way down to this port.

Trouble is being experienced at all Lake ports in consequence of the differences between the union and non union sailors, in several instances culminating in violence. The question of wages and the light movement of freight are at the bottom of the difficulty. There are also grievances among the stevedores, resulting in strikes. The handling of coal has been cut down 3c. per ton at Cleveland and other places.

The propeller line boats are receiving freight for all ports on the Lakes.

Vessels are stuck in the ice on the St. Clair River flats. Navigation is practically suspended between Lakes Huron and Erie.

Lake freighting is dull at this port. Vessel men made a 10-cent concession yesterday on coal hence to Toledo; the rate now is 30c. per net ton. The other rates unchanged.

Chicago. April 22.

(From our Special Correspondent.)

The local coal market is without any new features this week. A good retail demand for steaming purposes continues, but the wholesale trade reports nothing. From the best information obtainable, stocks are in a most satisfactory condition as to the amount on the docks, and have been reduced to the estimates given a couple of weeks ago, viz., less than 200,000 tons. This amount is considered very low for this market to begin a new season with.

The new Chicago Coal Board still attracts considerable attention from local coal merchants. A meeting was held on Saturday evening, the 18th inst., and the following officers were elected: President, H. S. Van Ingen; vice president, W. B. Mather; secretary, H. A. Bishoff. A constitution and by-laws were adopted and a committee appointed to secure permanent quarters.

The objects as stated by their prospectus are the advancement of the general interests of coal and coke dealers, including the following advantages: a board room where from 12:30 until 2 P. M. daily the members may meet and transact business; an arbitration committee for the adjustment of differences among the members; inspection of coal in case of disputed merchant ability; daily bulletins and promotion of better credit system.

All coal and coke producers and the accredited representatives of coal and coke operatcrs whose annual tonnage for the two years next previous to admission shall have been 30,000 tons, are eligible to membership; also, all shippers and receivers of coal and coke whose annual tonnage shall have been 30,000 tons for the two years next previous to admission. No rules will be passed regulating the market prices of coal and coke, but the board will favor and foster the freest legitimate competition among its members, and by a clearing-house system for the disposal of the surplus product, avoid the demoralization heretofore existing.

Prices of anthracite per ton of 2,000 pounds f. o. b. Chicago, are: Lehigh lump, $6.75; large egg, $5; small egg, range, and chestnut, $5.25. Retail prices per ton are: Large egg, $6.25; small egg, range and chestnut, $6.50.

Prices of bituminous per ton of 2,000 pounds f. o. b. Chicago, are: Pittsburg, $3.25; Hocking Valley, $3; Youghiogheny, $3.40; Indiana block, $2.30@$2.50; Illinois block, $2@$2.20.

Coke.—Connellsville, 72-hour, per ton f. o b. Chicago, $5.05; crushed, $5.40; Walston, $5.20; New River, $5.05.

Pittsburg. April 23.

(From our Special Correspondent.)

Coal.—The market remains steady with a fair trade demand. The mines along the Monongahela are turning out considerable coal. Shipments to the lower ports are over until we have a rise in the Ohio. Mining will be continued until all the empties in the pools are loaded. The rail trade is moving along steadily, showing no particular change. The current rates are, at Pittsburgh: River wholesale, $5@$6 per 100 bushels; railroad, $5@5.50 per 100 bushels.

Connellsville Coke remains in a very unsettled condition. Shipments are increasing daily. The coke firms have evidently made up their minds to start up their works and keep them running without regard to the opinions of other parties. The week's gain in shipments was large. The H. C. Frick Coke Company does not intend to run more than about 50 % of its ovens, while some of the other companies may decide to start additional ones. There are about 3,000 ovens in active operation; prices are uncertain, and are governed by circumstances. Western shipments are increasing. To points west of Pittsburg there were 656 cars; east of Pittsburg, 125; Pittsburg and river points, 60; total, 841 cars.

Nominal prices: Furnace coke. $1.90; foundry, $2.30; crushed, $2.65.

FREIGHTS.

From Philadelphia to: Boston, 85c.@$1.05; Charleston, 75c.; Gloucester,* 85c.; Lynn,* $1; Newburyport, 75c.; New Bedford, 75c.; New York,† 90c.; Norfolk, 55c.; Petersburg, 75c.; Portland, 97c.; Providence, 75c.; Richmond, 60c.; Saco, Me.,* $1.05; Savannah, 75c.; Washington, D. C.,† 85c.

* And discharging.
† Alongside.

METAL MARKET.

NEW YORK, Friday Evening, April 24.

Prices of Silver Per Ounce Troy.

April	Sterling Exch'ge	Lond'n Price.	N. Y. Cts.	April	Sterling Exch'ge.	Lond'n Price.	N. Y. Cts.
18	4.88	44⅛	97¼	22	4.88	43⅞	96
20	4.88	44 7-16	97	23	4.88	43⅞	96⅛
21	4.88	44⅛	96⅝	24	4.88	44	96⅛

Silver declined rather suddenly, occasioned by the failure of a large Bombay house, who was long of Exchange. Market to-day is stronger, with advancing tendency, owing to London inquiries. The Government is out of the market until May 1st.

The United States Assay Office at New York reports the total receipts of silver for the week to be 164,000 ounces.

Government Silver Purchases.

The Treasury Department informs us that the amount of silver purchased by the Government during the week was as follows:

	Offered, ounces.	Purchased, ounces.	Average price.
April 20	894,000	594,000	·9741
" 22	582,000	177,060	·9639

Silver Bullion Certificates.

	Price. H.	Price. L.	Sales.
April 18	....	....	.....
April 20	97⅜	97⅛	140.000
April 21	97	96⅝	40,000
April 22	96⅝	96½	195,000
April 23	96⅝	96⅜	80,000
April 24	97⅜	96¾	206,000
Total sales			661.000

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	$ .76	$ .79
Mexican dollars	.76	.77
Peruvian soles and Chilian pesos	.73½	.75
English silver	4.86	4.88
Five francs	.94	.95
Victoria sovereigns	4.87	4.89
Twenty francs	3.87	3.88
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.80	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	.97¾	.98

Foreign Bank Statements.

The governors of the Bank of England, at their weekly meeting on Thursday, made no change in the minimum rate of discount, which remans at 3½%. In the week the bank gained £485,000 bullion, and the proportion of reserve to liabilities was raised from 34·86% to 36·63%, against a decline from 45·30% to 44·45% in the corresponding week last year, when its discount rate was unchanged at 3%. On the 23d inst. the bank lost £178,000 bullion on balance. The weekly statement of the Bank of France showed an increase in gold of 3,275,060 francs and 3,975,000 francs in silver.

Copper.—The market has been rather uninteresting, and though prices are fairly maintained from last week, there is a tendency, which looks to us to be rather flattish. No lake copper is obtainable below 13¾c. either for present or later delivery, but Arizona ingot copper can be purchased at a trifle below 13c., and Arizona pig copper at about 11·35c. Casting copper is somewhat more freely offered at from 11·25c. to 11·35c. Lately shipments to Europe have not been as heavy as during the past two months, and it is supposed that they will be lighter in May, especially as no Anaconda matte will go out in that month, the mines and smelter of this company still being closed down.

In Europe the market has been rather flattish, and a considerable decline in prices has taken place. The increase in the visible supplies, which we reported last week, has evidently created rather a flat feeling on the other side. Chili bars, which closed last week at £51 5s. for spot, have come down gradually, to £50 15s. spot and £51 5s., three months, at which they close. The consumptive demand is reported to be rather poor just now. We quote: English tough, £53@£53 5s.; best selected, £55@£55 5s.; strong sheets, £59@£60; India sheets, £57 10s.@£58; yellow metal sheets, 5¾d.

The exports of copper during the past week were as follows:

To Antwerp—	Copper.	Lbs.	
By S. S. Pennland	60 casks.	75,000	$9,000
" "	776 pigs.	118,732	14,000
" Nederland	69 cakes.	11,249	1,462
To Liverpool—	Copper Matte.	Lbs.	
By S. S. Runic	1,901 bags.	200,948	12.000
" "	1.274 "	139,017	8.500
" Arizona	3,169 "	328,235	20,000
To Liverpool—	Copper.	Lbs.	
By S. S Olive Branch	— pigs.	69,444	7,639

Tin.—The downward tendency in price has continued and the week closes with prices about 25% lower. The arrivals have been rather large and will continue so during the next fortnight. Part of this tin appears to be in rather weak hands and is now being pressed on the market which accounts for the lower prices established here than the parity of London or the East. We quote spot and April, 19·50c.; May, 19·50c.; June, 19·60c.; July, 19.60c.

The London market has also given way somewhat, although not to the extent that ours has, and there the visible supplies have also somewhat increased lately. The week opened with spot at £89, and futures at £89 5s., but came down to £88 17s. 6d. for spot; £89 2s. 6d. for futures, at which it closes.

Lead.—Lead has been dull, and, on the whole, neglected. Some sales were made early in the week at 4·10c., but afterwards a little better tendency sprang up and a few hundred tons changed hands at 4·15c. to 4⅛c., which is the closing figure. We hear that the offerings are not very heavy, but consumers can have all they want. A good deal of lead is held on dock here, and we understand that some pretty large quantities have recently been put in store.

The English market is flat: Spanish is quoted at £12 7s. 6d., and English at $12 10s.

Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: "There is a better inquiry for lead, Sales for the week foot up 500 tons, mostly at 3·95c. The closing is quiet, 4c. being asked."

St. Louis Lead Market.—John Wahl Commission Company telegraphs us as follows: "Lead presents no novelty, as both sellers and buyers have become accustomed to the dormant situation. Prices are nominal at 3·90c., with light sales."

Spelter.—Spelter is still very irregular, and we must quote the price for spot and near delivery at 4·90@5c.

In London specials are quoted £22 15s., and ordinaries £22 10s.

Antimony.—Antimony is considerably lower. Makers in England have reduced their prices quite considerably of late, and were it not that stocks over here were very light, prices would no doubt have already gone lower. We have to reduce quotations of Cookson's to 16½c. L. X. @ 15¼c., and Hallett's to 14¾c.@15c., and for delivery next month somewhat lower prices are being accepted.

Nickel.—We have nothing fresh to report and quote nominally 67½@70c.

Quicksilver.—No new feature has developed. Trade is very quiet and stocks seem to be accumulating so that, if anything, our last quotations might be shaded. Nominally, the price here is quoted at $42½@$43. The London market has suffered more, apparently. Sales have been made at £8 and more is offering at that figure.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 17.

Week after week we have had to record stagnation in the iron market, and the past week has shown no change. There has been absolutely no new feature whatever; dealers report about the same volume of business as last week; buying has been of the same hand-to-mouth character which has characterized the trade for the past three months, and prices show no change, being neither weaker nor stronger. The market may be said to be a waiting one. Buyers are clearly convinced that there is no prospect of a rise in prices, and, sure of a supply of iron, are purchasing only to fill immediate wants, and holding off for further developments.

On the other hand, the general impression now is that there is little probability of lower prices, and in this respect the feeling of the trade is rather stronger than a month ago. Stocks of iron have certainly been greatly reduced, removing the incubus which has hung over the market, and production has been reduced at the same time to such an extent that it is not likely that it now exceeds consumption in any measure of consequence, if at all.

On the whole, there may be said to be a little more hopeful feeling in the trade, now that the first quarter of the year has passed, and without any very definite reason there is a general impression that the demand for iron will from now on show gradual improvement, and that good business will be done in the summer and autumn.

American Pig Iron.—The market has been dull during the past week, and there is little to note concerning it. There has been no iron pressing for sale, and prices have consequently remained firm, all standard brands of both Northern and Southern iron remaining in the same position as last week. We quote: Northern, No. 1 X, $17.50@$18; No. 2 X, $16.50@$17; Southern, No. 1 X, $17.50@$18; No. 2 X, $16.50@$17. The demand for Scotch pig iron, which experienced a little spurt about a month ago, has entirely fallen off again, and now few inquiries are noted.

Spiegeleisen and Ferro-Manganese.—There appears to be no demand for either spiegeleisen or ferro-manganese, and the market is lifeless in consequence. We quote, nominally, spiegeleisen 20%, $27.50@$28.50; ferro-manganese, $63.50@$64.50

Steel Rails.—After the brisk spurt of last week the market has again fallen flat, and this week no transactions worth note whatever, are reported. The rolling mills undoubtedly have enough orders booked to keep them busy for the present, and are maintaining the price firm at $30 at the mills.

Rail Fastenings.—There is no change in the market from last week. We quote: Spikes, $2; angle plates, 1·70@1·80c.; bolts and square nuts, 2·65@2·75c.; hexagonal nuts, 2·85c.; complete joint, iron and steel, according to weight.

Tubes and Pipe.—Business is gradually improving and is considered very fair for this season of the year. It has been considerably better during the past month than during the previous one, and is expected to show further improvement in May. We quote discounts on carload lots as follows: 47½% on butt, black; 40% on galvanized; 60%

on lap, black; 47½% on lap, galvanized; boiler tubes, 50% on all sizes; casing, all sizes, 50%.

Structural Iron and Steel.—The market shows no new features. We quote: Universal plates, $2.15; bridge plates, $2.10; angles, $2.20; beams, $3.10.

Merchant Steel.—Business shows somewhat of a falling off, and there is a tendency toward weakness in prices. Large orders are reported to have been placed for six months' delivery at figures considerably below present quotations. We quote, nominally: Best English tool, 15c., net; American tool steel, 7@8c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2·60c.; open-hearth spring, 2·60c.; tire steel, 2·60c.; toe calks, 2·60c.; first quality sheet, 10c.; second quality sheet, 8c.

Old Rails.—There are no reports of any transactions of consequence, and the market is inactive. We quote: $22@23 for tees and $25 for doubles.

Wrought Iron Scrap.—There is nothing doing. We quote, nominally, $20@$22 at yards.

Cleveland. April 23.

(From our Special Correspondent.)

There is but little, if any, change in the situation of the iron ore market. No sales have been reported during the past week for delivery during the coming season of navigation. A few small lots have been disposed of for current use. The buying movement, which commenced recently among Eastern furnace men, has received a setback from the fact that the ore men are unwilling to make any further sales until the question of railroad freights is definitely determined.

Ten days ago it was generally supposed that the Eastern railroads would reduce their rates 15 to 20 cents a ton. The ore men, on this supposition, made several sales. It is now understood, however, that the railroads will make no changes in their rates. As long as the Eastern buyers are unwilling to pay more than 8 cents per unit for our lowest grades, and 9 cents per unit for our highest grades of Non-Bessemer Lake Superior iron ore, business with the East will be exceedingly small, unless the railroads adopt a more liberal policy. There is nothing doing yet in lake freights. The charcoal-furnace men say they will not buy anything until next month. The Illinois Steel Company is not in the market. The large Pittsburg buyers are still holding off, and as the furnaces in the Mohoning and Shenango Valleys are still out of blast, there is no indications that they will purchase their ore supplies at present.

Prices may be quoted as follows:

Specular and Magnetic Ores.

Bessemer	65@69%	$5.50@$6.25
"	60@64%	4.25@ 5.25
Non Bessemer	66@69%	4.75@ 5.25
" "	62@65%	4.00@ 4.75
" "	50@60%	3.75@ 4.00

Soft Hematites Dried at 212°.

Bessemer	62@65%	$4.50@$4.75
"	58@61%	4.00@ 4.25
Non-Bessemer	55@63%	3.50@ 4.25

Above prices are for deliveries on docks at Lake Erie ports.

Chicago. April 22.

The Chicago iron market continues to show the improvement noted last week in the volume of business done. Raw materials continue weak in prices, however, and orders are mainly for small lots. Manufactured iron shows a general improvement both as to orders and inquiries. The railroads have been buying some, and store trade has been quite good. Prices remain unchanged, but are quite firm for manufactured iron and steel.

Pig Iron.—Pig iron continues very quiet and without any special features. Considerable charcoal iron was disposed of at quite a cut in prices, but this was confined to a few furnaces which were compelled to realize on their stocks. Other furnaces will not sell at the present prices, and have withdrawn from the market. In coke irons a very fair trade was done in carload lots, but few sales of any size were consummated, although some slight concessions were offered on round lots.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, $17.25@$18; Lake Superior coke, No. 1, $15.50@$16; No. 2, $15@$15.50; No. 3, $14.50@$15; Lake Superior Bessemer, $17; Lake Superior Scotch, $16.50@$17; American Scotch, $18.50@$19; Southern coke, Foundry No. 1, $16.25; No. 2, $15.75; No. 3, $15.25; Southern coke, soft, No. 1, $15.75; No. 2, $14.75; Ohio silveries, No. 1, $18; No. 2, $17; Ohio strong softeners, No. 1, $18.25; No. 2, $17.50; Tennessee Charcoal, No. 1, $18; No. 2, $17.50; Southern Standard Car Wheel, $21@$23.

Structural Iron.—Structural iron continues very active, and local representatives of eastern mills are figuring on several large iron structures to be erected in this city during the coming season. The demand is steady and inquiries are in good numbers. Quotations remain unchanged for car lots f. o. b. Chicago: Angles, $2.20@$2.25; tees, $2.75@$2.85; universal plates, $2.35@$2.45; sheared plates, $2.40@$2.50; beams and channels, $3.20.

Plates.—Plate iron shows considerable improvement this week both as to orders and inquiries. Some good orders for delivery next month have been placed with Valley mills, and store trad has improved considerably over last week. Quotations remain unchanged: Steel sheets, 10 to 14, $2.70@$2.80; iron sheets, 10 to 14, $2.60@$2.70; tank iron or steel, $2.50@$2.70; shell iron or steel, $3@$3.25; fire-box steel, $4.25@$5.50; flange steel, $3.25@$3.40; boiler rivets, $4.25.

Merchant Steel.—Merchant steel has improved slightly. The eastern manufacturers have received some orders of fair size at market prices; store trade has been good and the railroads are beginning to buy. Prices remain unchanged: Tool steel, $6.75@$7; tire steel, $2.40@$2.60; toe calk, $2.60@$2.75; Bessemer machinery, $2.20@$2.30; open hearth machinery, $2.60@$2.75; open-hearth spring, $2.75@$3; crucible spring, $3.75@$4.

Steel Rails.—There is no change to be noted. Both the local and eastern firms are booking a very fair number of small orders, but nothing very large has yet been placed from this market as far as can be learned. The North Works of the Illinois Steel Company will probably start up next week. Quotations remain unchanged at $31.50@$32.50 per ton f. o. b. Chicago. Splice bars at $1.95@$2, and spikes at $2@$2.10 per 100 pounds.

Galvanized Sheet Iron.—Galvanized sheets are only in fair demand from store. The outlook, however, is very bright for a large summer trade. The mills are running steadily and report orders in very fair numbers. Discounts are unchanged at 67% off on Juniata and 65% and 5% off on charcoal.

Black Sheet Iron.—The only change to be noted in black sheets is a slight increase in orders and inquiries. These are not yet in satisfactory numbers, but the market shows an improvement. Quotations are $2.85@$3 for No. 27 f. o. b. Chicago for car lots.

Bar Iron.—Bar iron shows considerably more activity. Some good orders have been received and quotations are now out for some large orders. Slight concessions have been granted, but not more than would have been given for some time past for orders of the same size. Local mills quote $1.60@$1.65 f. o. b. Chicago; and Valley mills, $1.55 f. o. b. mills.

Nails.—Nails continue in very fair demand, and some firms are selling in good amounts. Slight concessions are heard of for round lots, but prices as a rule are maintained pretty closely. Wire nails have improved a little over last week. Quotations are: Steel wire nails, $2.20@$2.25; steel cut nails, $1.75@$1.80 carloads f. o. b. Chicago.

Scrap.—Scrap iron is without any new feature. The market continues very dull. Sales have been few and for small amounts only. If any difference can be noted, there is a little better demand for the better than for the cheaper grades. Quotations per net ton f. o. b. Chicago are: No. 1 railroad, $19; No. 1 forge, $18.50; No. 1 mill, $14.50; fish-plates, $21; axles, $24; horseshoes, $19; pipes and flues, $13; cast borings, $8; wrought turnings, $11; axle turnings, $13; machinery castings, $12; stove plates, $8; mixed steel, $11; coil steel, $15.50; leaf steel, $16.25; tires, $17.

Old Rails and Wheels.—No change is to be noted in old rails and wheels. The market is flat, and no transactions are reported. Quotations are: Old steel rails, $13.50@$17, according to length; old iron rails, $23.50; old wheels, $17.

Louisville. April 18.

(Special Report by Hall Bros. & Co.)

There is nothing encouraging that we could add to our last report. We should say that the market is firm, but dull; there is, however, a hopeful feeling. Both producer and consumer feel confident their views are correct, though it would appear that a radical change, one way or the other, must come, but how soon and when, is for the future to determine. It may be truly said that consumption has been considerably reduced, but not so much as production. Good crops will strengthen the situation, and reports from a good many directions are that crops are very promising. A prominent furnaceman, who has a new furnace, was in our midst during the week. He says they will not blow in until the market gets better, and that there is no money in the making of iron at present prices. He thinks that the market is sure to improve soon. Sales ranging from carloads up have been made for prompt shipment and at shaded figures. As a whole we continue to quote current figures:

Hot Blast Foundry Irons.—Southern coke, No. 1, $14.25@$14.50; No. 2, $13.75@$14; No. 3, $13.25@$13.50. Southern charcoal, No. 1, $16.50@$17; No. 2, $16@$16.50. Missouri charcoal, No. 1, $17.50@$18; No. 2, $17@$17.50.

Forge Irons.—Neutral coke, $12.50@$13; cold short, $12.50@$13; mottled, $12@$12.25.

Car Wheel and Malleable Irons.—Southern, standard brands, $21@$22; Southern, other brands, $17.50@$18. Lake Superior, $21.50@$22 50.

Philadelphia. April 23.

(From our Special Correspondent.)

Pig Iron.—The crude iron market has gained considerably within the past few days, both in sales of Northern and Southern. Large transactions have been quietly closed for special and standard brands of Pennsylvania irons, for delivery during the next three or four months, and in some few instances for longer periods. The effect has been to hurry up a number of smaller buyers, but quotations have not been advanced, and probably will not be, especially in inferior irons. Forge is under more inquiry than any other kind, as a good many mill owners have run down very low. Quotations, $14.50@$15.25. A good deal of Southern forge has been offered at $14, but not much sold at that figure. Pennsylvania No. 2 is quoted at $16@$17; inferior No. 1 foundry is to be had at $17.

Muck Bars.—Several offers have been made within a day or two of $26.50. Asking price for good bars is $27.00 to $27.25; quite a little business has been done since Monday.

Steel Billets & Slabs.—Billets are quoted at $28 to $27.50; Slabs, $27.50 to $27.25. There are no large offers on the market.

Merchant Iron.—Refined bars are quoted $1.75 in country mills, and $1.85 at city. Country mills are picking up a good deal of business at $1.65 to $1.70, and the general opinion is that there will be a moderate expansion of demand all around.

Skelp.—Asking prices are $1.70 to $1.85 respectively, but there is not much business.

Wrought Iron Pipe.—There are parties who have large orders to place, but very little business is coming to hand; no change in discounts.

Sheet Iron.—The market is irregular and the manufacturers report it difficult to sell iron in large lots. Buyers are not well supplied, but they do not care to place large orders at present.

Plate and Tank Iron.—There is scarcely any difference between iron and steel tank; small lots of flange are sold at 3·25c., and fire-box at 4c. There is sufficient business coming along to enable mills to run as they have been for a month or two past.

Steel Rails.—A large amount of business has been done since Monday in steel rails on a basis of $30.50@$31, in small lots.

Old Rails.—Quotations are $22.50.

Scrap.—Railroad can be had at $22@$23, and all that is offered is quickly picked up.

Pittsburg. April 23.

(From our Special Correspondent.)

Raw Iron and Steel.—Trade since our last report has been reasonably good, all things taken into consideration. With the labor and coke questions still unsettled, many dealers show little disposition to force business. As regards the future there is a wide difference of opinion; it seems, however, pretty certain that prices for certain descriptions have about reached the lowest point and that an improvement is not far off. Bessemer prices during this week have advanced with reported sales of spot at 50 cents above the previous week's figures. The change at present is not very marked, but indications of improvement in the not very distant future are considered pretty certain. There have been no large operations in iron ores yet; buyers are still holding off, notwithstanding the fact that ore can be purchased at $1.50@$1.75 per ton below prices paid last year.

The reports from the Shenango and Mahoning valleys continue favorable for furnace men, prices being firm, with a good deal of iron being disposed of at prices fully up with Pittsburg rates. A furnace man from the valley remarked: "Trade continues good; Bessemer pig is scarce, with an upward tendency. Gray forge is in fair demand. Prices are tending higher, being fully as high as at Pittsburg. All that is required to boom the Valleys being lower coke and freight rates." The stock of raw iron on hand seems to be steadily declining. There is only a limited number of city furnaces in blast; owners seem very indifferent about starting up the others.

New steel rails; this market firm with considerable inquiry; we learn of sales aggregating 100,000 tons in lots at $30 cash at the works. Anthracite pig; in former years the sales of this description were large, but of late this kind of iron has left our market, no sales being made for a long time. Southern iron; there is a very limited demand for this description; an occasional lot is purchased, which is generally used in mixtures; consumers prefer Pittsburg-made iron when it can be obtained.

The market during the past two days indicates a better feeling. Spot Bessemer advanced, and futures hold their own; grey forge is firmer with sales of favorite brands at a slight advance; billets and slabs are weaker. Prices of ferro-manganese are maintained. There have been sales of muck bars at last week's prices. Blooms and rail ends sold higher. Steel wire rods 25 cents higher. Skelp iron, prices are a shade lower. Old iron and steel rails demand restricted and prices unchanged. Scrap material quiet, prices maintained.

Coke Smelted Lake and Native Ores.

2,500 Tons Bessemer	$16 00 cash.
2,000 Tons Grey Forge	14.00 cash.
1,500 Tons Bessemer	16.00 cash.
1,000 Tons Grey Forge	14.00 cash.
1,000 Tons Bessemer	15 90 cash.
1,000 Tons Bessemer	16.00 cash.
1,000 Tons Grey Forge, valley furnace	14.00 cash.
1,000 Tons Grey Forge, valley furnace	14.20 cash.
1,000 Tons Grey Forge, valley furnace	14.25 cash.
500 Tons Grey Forge	14.25 cash.
500 Tons Grey Forge, Youngstown	14.25 cash.
500 Tons Grey Forge	14.10 cash.
200 Tons Mill Iron	14.50 4 m.
200 Tons Off Bessemer	15.25 cash.
100 Tons No. 1 Foundry	17.00 cash.
100 Tons No. 2 Foundry	15.50 cash.
100 Tons No. 1 Foundry, all ore	17.80 cash.

Charcoal.

100 Tons No. 2 Foundry	22.00 cash.
100 Tons No. 2 Foundry	21.50 cash.
100 Tons Cold Blast	26.00 cash.
50 Tons Warm Blast, Southern	21.50 cash.

Muck Bar.

800 Tons Neutral, May and June	26.37½ cash.
500 Tons Neutral, May	26.25 cash.

Steel Slabs and Billets.

2,000 Tons Steel Billets	25.50 cash.
2,750 Tons Billets and Slabs	25.00 cash.
1,000 Tons Billets	25 00 cash.
1,000 Tons Billets	24.80 cash.

Steel Wire Rods.

650 Tons American fives, June	36.25 cash.
380 Tons American fives	36.00 cash.

Ferro-Manganese.

200 Tons 80%, Pittsburg	64.50 cash.
100 Tons 80%, Seaboard	64.00 cash.
100 Tons 80%, Baltimore	64 00 cash.
18 Tons 80%, Jersey City	64.50 cash.

Bloom Rail and Billet Ends.

1,000 Tons Bloom Ends	17.75 cash.
500 Tons Bloom and Billet Ends	17.25 cash.
350 Tons Bloom Ends	17.50 cash.

Skelp Iron.

950 Tons Wide Grooved	1.65 4 m.
200 Tons Narrow Grooved	1.62½ 4 m.
200 Tons Sheared Iron	1.82½ 4 m.

Old Iron and Steel Rails.

300 Tons American Ts	24.00 cash.
300 Tons Steel Rails, short pieces	17.50 cash.

Scrap Material.

300 Tons Cast Scrap, Gross	14.00 cash.
300 Tons Cast Iron Turnings, Gross	14.00 cash.
300 Tons Wrought Iron Turnings, Net	14.00 cash.
300 Tons Iron Car Wheels, Gross	16.00 cash.
200 Tons No. 1 W. Scrap, Net	20.00 cash.
150 Tons Iron Axles, Net	26.50 cash.
50 Tons Iron Axles, Extra Net	28.00 cash.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, April 24.

Business during the week has left much to be desired, and from almost all sides we receive unsatisfactory reports. No very large stocks have been allowed to accumulate, but this is due quite as much to the fact that but little came in that was not already contracted for, as to any realizing sales of spot goods. The demand has been very intermittent, and contracting for shipment even, has been of small account, as compared to some past records. Alkali 48% has been the exception of the market, and has met with considerable inquiry. Stocks show signs of depletion and very little is at present in first hands. Bleach is in somewhat a firmer position than it was. Cables announcing that the Alkali Union had decided to reduce production 25% at once, could not fail to have this effect, although the market had been too heavily burdened for some time back for the reaction to be immediate. The cessation of shipments under consular seal privileges, via Canada, does not as yet seem to have affected trade very materially.

In the lighter chemical market the stringency has been very much relieved by recent large arrivals, and the possibility of buying much below our last quotations for immediate steam shipment from abroad. Some lots in second hands, which are, being pressed for re-sale, have also had much to do with this change. Nitrate of soda has taken quite a tumble on account of unexpected arrivals of January shipments which are by no means all placed. The position of brimstone has been maintained at our last quotations, and, if anything, is firmer. The spot supply is practically exhausted, and business is almost entirely restricted to contracts for shipment.

Caustic Soda, 60%.—Arrivals have continued to a large extent under contract and most of the surplus, noted in our last report has also gone into second hands. Contracts for shipment have been made on more favorable terms, 3·32½@3·37c., and the market closes pretty firm at these figures. 70@74%. Competition for orders has been quite keen, so that buyers have had an opportunity to supply themselves at much below our last quotation. We quote 3·02½@3·07½c. on dock, but even at these figures not much was placed and now most of what came in is held at 3·10@3·12½c. ex store. Inducements were offered buyers on account of the large arrivals and the desire among dealers to save the expense of storing. 77%. The exceptionally strong position of this brand continues as heretofore. There is practically no stock on hand and orders for shipments are easily placed at 3 10c. During the week nothing has come in that was not already sold.

Alkali, 48%.—The demand has been most satisfactory and the end of the week finds dealers with very small stocks. Inquiry for both spot and shipments continues, and most of what comes in and had not previously been contracted for is almost immediately placed. We quote 1·57½@1·60c. High Test.—Dealers are asking 1·47½@1·50c., but we have received information which would indicate that business might be done at considerably less. The first drop from 1·50c. several weeks ago was caused by the desire of some dealers to realize, and conditions appear to be very much the same now, with buyers apparently confident that time will change values very much in their favor.

Caustic Soda Ash, 48%.—The stagnation of trade which has been characteristic of the market has been broken temporarily. Some inquiry in a limited way for future delivery has elicited offers at 1·50@1·55c., as to make, quantity, etc.

Sal Soda.—Conditions continue most unfavorable to holders, further arrivals have added to already burdensome stocks and the demand shows no signs of making great inroads into the supply. Dealers are quoting 1@1·02½c., which is a little more than sales were made at last week, and doubtless for a round lot these figures could be shaded.

Bleaching Powder is held a little firmer. Cable advices report that the Alkali Union is about to, or has already reduced its output 25%. Stocks here in the beginning of the week were very large, and have not been much reduced, but dealers are asking rather more. Sales could probably not be made under 1·72½@1·77½c.

Acids.—The even tenor of trade in acetic acid has been somewhat broken during the week by some charp competitive bidding for business. While 1·50@1·60c. is nominally quoted, sales are reported to have been made at the lowest figure, with a discount for cash. Muriatic and nitric are changing hands in small lots. Trade in sulphuric acid has shown a discouraging feature. The demand was not as active as heretofore, and although our last quotations are fairly well maintained, the market is weaker and the disposition to cut prices is commencing to make itself felt again. With reference to the proposed agreement among manufacturers but little has transpired. No further steps seem to have been taken, and the views on the matter, expressed in this column a few weeks ago, voices the general sentiment of those concerned. We felt the compliment intended by our esteemed contemporary, the *Oil, Paint and Drug Reporter*, in quoting our opinions on this subject in its issue of April 15th, but do not follow the reasoning by which we are referred to as a correspondent.

We quote acid per 100 pounds in New York and vicinity: Acetic, $1.50@$2; muriatic, 18°, 80c.@$1; muriatic, 20°, 90c.@$1.10; muriatic, 22°, $1@$1.20; nitric, 40°, could probably not be touched for less than $4.50 and from that upward, according to quantity, etc.; nitric, 42°, $5@$5.25; sulphuric, 60°, $1@$1.25; sulphuric, 66°, $1.12½@$1.75.

Fertilizers.—All around, the market is not as strong as at the time of our last report. Arrivals have done considerable toward relieving the stringency which was so prominent a feature then, and although stocks are now by no means overlarge, they appear to be sufficient for current wants. The position of South Carolina phosphate rock is about the same. No new developments have been made with reference the Coosaw River difficulties, and consumers are commencing to look for their supplies in other directions. This suspension cannot fail to be a material gain to the Florida, Carolina land and Canadian phosphate producers. A good demand is supplied at from $7.25 to $7.50 per ton f.o.b. Charleston, ground rock is held at from $8 to $11.50 per ton.

We are indebted to Mr, P. C. Trenholm for the following comparative statement of shipments of phosphate rock from Charleston during the month of March of the last three years:

	1889.		1890.		1891.	
	Crude.	Ground.	Crude.	Ground.	Crude.	Ground.
Domestic	21,786	392	14,606	.....	17,619	.....
Foreign.						
U. Kingdom	.....	.....	5,340	.....	.....	.....
Copenhagen	.....	.....	1,650	.....	.....	.....
Goftenburg	.....	.....	.....	.....	95	.....
Total	.....	.....	6 990	.....	95	.....
Grand total	21,786	392	1,596	.....	17,714	.....

Values of sulphate of ammonia, made from gas liquor, have experienced a slight reaction. There is not much here and the arrivals have been almost exclusively on contract; but there are some domestic goods now on the market. Manufacturers seem well filled up for the time being, and steam shipments from abroad can be contracted for at much below our last quotations. These facts have all combined to produce somewhat lower prices. Sales have been made at from 3·17 to 3·25c. Bone sulphate is in a firmer position. The spot supply in first hands is almost nil, but there are one or two lots which manufacturers are willing to reseil, and, of course, this has a slightly depressing influence. We quote 3·17½@3·25c.

The demand for dried blood has not been as large as heretofore. Small lots are changing hands freely, as manufacturers seem to be only filling immediate wants. We quote 2·02½@2·07½c. for high grade and 10c. for low-grade blood. Azotine has gone freely into second hands, and stocks here are small. Philadelphia and Western goods are offering in large quantities, and sales for both spot and future delivery have been made at 2·05c. Bone black is held firmly at $20 and there is none offering excepting in small lots. Bone meal is in about the same position and is selling at $22.50@$23 per ton, as to quantity. Sulphate of potash has arrived quite freely, a large November shipment by the "Helene" from Hamburg having done much to make the market easier. The larger part of this was on contract, and the few unsold lots are held at from 2·05 to 2·10c. Double manure salt has also come in freely. Dealers are quoting 1·10@1·15c.

Brimstone.—The spot supply is all in second hands, so that business is restricted to contracts for delivery. Greatly to the surprise of most in the trade, values have again shown a very decided tendency to increase, due to cable advices from Sicily received in the early part of the week. Contracts are now being made at $31@$32 per ton for May, June shipments, and nearby steamers are selling at from $35 to $36. Business is rather restricted on account of the uncertain tenor of the market. Thirds are selling at from 75c. to $1 less.

Muriate of Potash.—The arrivals have been very extensive, aggregating about 1,250 tons at all ports, and while these have gone immediately into second hands, the market is much easier. Sales of spot and to arrive, amounting to about 300 tons, have been made. The demand continues good, and leaves manufacturers' agents working hard for charters from abroad.

Nitrate of Soda.—The arrivals have been heavier than for some months past, and comprise three full cargoes from the West Coast. As some uncertainty was felt, as to whether these vessels had been able to go to sea, a large part of the arrivals were uncontracted for, and no better than 2·12½c. for 500 bags could probably be done now. At these figures business is not over brisk. The impression prevails that the blockade is near its end, or that at least shipments of nitrate on something like a reasonable basis with reference to internal revenue will soon be possible, and this is doubtless a factor in the comparative indifference with which nitrate at 2½c. is regarded.

Liverpool. April 15.

(Special Correspondence by J. P. Brunner & Co.)

There is very little life at the moment in our market for heavy chemicals, and only a hand-to-mouth business is passing. Quotations, however, show little change, and are well maintained.

Soda Ash.—Some special brands are very scarce, and are held for a premium, but the actual business passing is small. For ordinary makes minimum quotations are as follows: Caustic ash, 48% £5 2s. 6d.; 58%, £6 4s., net cash. Carb. ash, 48% £5 7s. 6d; 58%, £6. 10s., net cash. Soda crystals are selling at £3 7s. 6d.@£3 10s. per ton, less 2½%. Caustic soda has become quiet again, and buyers are less disposed to operate. Prices are practically unchanged, the following being nearest spot quotations: 60%, £9 15s.; 70%, £11; 74%, £12; 76%, £13 and upwards, all net cash. Some first-class brands are held for an advance. A reduction of 5s. per ton has been made for specially large lines, also for contracts extending over six months or to the end of the year. Bleaching powder is almost unsaleable at the moment, and although the "Union" declined to make any concessions on £7 per ton, net cash, for hard wood, some second-hand lots could probably be had for less money, but buyers hold aloof. Chlorate of potash is offered rather more freely at 5¾d.@5¼d. per pound, less 5%. Bicarb. soda is in fair demand at £6 15s.@£7 per ton for one-cwt. kegs, according to brand and quantity, with usual allowances for larger packages. Sulphate of ammonia has eased off a little, and there is rather more business doing at the decline. For good grey 24% run in single bags f. o. b. Liverpool £11@£11 2s. 6d. per ton is about value to day; £11 12s. 6d.@£11 15s. is asked for 25% in double bags.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, April 24.

There have been fewer realizing sales in this market during the past week than in the preceding.

Hard Brick has come in in large quantities, and consumers have not been bidding very much, so that in some cases concessions have had to be made. With these exceptions values have been fairly well maintained, and a tendency to rise from our last quotations of pale has been quite noticeable. Lime has not changed hands to any great extent. Although dealers report that everything is being done to restrict production, enough is thrown on the market to keep values at their lowest level. Business in cement has hardly had time to commence for the season, but it is looked forward to most hopefully.

Bricks.—Haverstraws are a little weaker at from $6 to $6.75. Trade is very intermittent and dealers' demands vary considerably according to arrivals. Accumulation has commenced again and it is feared, unless large quantities should be taken up, sales may again have to be made at lower prices. Jerseys and Keyport are selling at from $4 50 to $5.50 per M., depending on grade and lot. Pale is not in so heavy stock as some of the other grades; $2.25 can only be quoted for very large lots, while $2.50 is probably nearer general demands of sellers.

Lime.—Rockland finishing finds a good market at $1. Common is selling for 90c. The supply has been kept very near the demands of trade, so that surplus stocks are very light. A lot will sometimes be placed on the market for immediate sale and then these figures may have to be shaded, but the general tone of business is good and promises to continue so.

DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and Amount of last			Dividends. Total paid.	Dividends. Date & amount of last.		
1	Adams, S. L. C.	Colo..	$1,500,000	150,000	$10	*			$570,000	April	1891	.05
2	Alice, S.	Mont.	10,000,000	400,000	25	*			920,000	April	1891	.06½
3	Alma & Sel Wood., G.	Idaho	30,000	30,000	10	*			60,000	Jan..	1889	.50
4	Amador, G.	Cal.	1,250,000	25,000	5	*			31,250	Aug..	1890	.12½
5	American Belle, S.G.C	Colo..	2,000,000	40,000	5	*			5,000	April	1891	.12½
6	Americ'n & Nettie, G. S	Colo..	.....	300,000	.....	.....	.....	.....	150,000	Nov..	1889	.10
7	Amy & Silversmith, S.	Mont.	341,419	.....	.....	.....	.....	.....	247,530	Aug..	1887	.12½
8	Atlantic, C.	Mich..	1,000,000	40,000	25	$280,000	April	1875	$1.00	700,000	Feb..	1891	1.00
9	Argenta, S.	Nev..	10,000,000	100,000	100	335,000	July.	1889	.10	40,000	Feb..	1890	.20
10	Aspen Mg. & S., S. L.	Colo..	2,000,000	20,000	10	*	.....	.....	.....	640,000	April	1891	.10
11	Aurora, I.	Mich..	2,000,000	100,000	20	.....	.....	.....	.....	255,000	Mar..	1891	1.00
12	Badger, S.	Ont...	250,000	50,000	5	.....	.....	.....	.....	37,500	Mar..	1890	.25
13	Bangkok Cora-dell, S.	Colo.	600,000	600,000	1	*	.....	.....	.....	44,510	Aug..	1890	.00½
14	Belle Isle, S.	Nev..	10,000,000	100,000	100	190,000	Dec..	1889	.15	333,000	Dec..	1879	.25
15	Belcher, S. G.	Nev..	10,440,000	104,400	100	2,978,000	Feb.	1891	.50	13,397,000	April	1876	1.00
16	Bellevue, Idaho, S. L.	Idaho	1,250,000	125,000	10	120,000	Dec..	1889	.25	200,000	Jan..	1890	.10
17	Bi-Metallic, S. G.	Mont.	5,000,000	200,000	25	.....	.....	.....	.....	550,000	Mar..	1891	.35
18	Bodie Con., G. I.	Cal..	10,000,000	100,000	100	550,000	June	1890	.25	1,602,572	April	1885	.50
19	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*	.....	.....	.....	520,000	June	1886	.15
20	Boston & Mont., C. S.	Mont.	2,500,000	100,000	25	*	.....	.....	.....	1,825,000	May.	1891	1.00
21	Breece, I.	Colo..	5,000,000	200,000	25	*	.....	.....	.....	2,000	Feb..	1890	.01
22	Brooklyn Lead, L. S.	Utah.	500,000	50,000	10	.....	.....	.....	.....	127,000	July.	1887	.05
23	Bullion, Beck. & C., S. L.	Utah	1,000,000	100,000	10	.....	.....	.....	.....	730,000	Nov..	1890	.50
24	Bulwer, G.	Cal..	10,000,000	100,000	10	150,000	Aug..	1889	.25	175,000	Jan..	1884	.10
25	Bunker Hill & S. S. L.	Idaho	3,000,000	300,000	10	*	.....	.....	.....	150,000	Oct..	1883	.06½
26	Caledonia, G.	Dak..	10,000,000	100,000	100	505,000	May.	1885	.15	192,000	Oct..	1890	.08
27	Calliope, S.	Colo..	1,000,000	1,000,000	.....	.....	.....	.....	.....	140,000	Jan..	1891	.04½
28	Calumet & Hecla, C.	Mich..	2,500,000	10,000	25	1,200,000	.....	.....	.....	38,350,000	Jan..	1891	5.00
29	Carlisle, G.	N. M..	1,000,000	40,000	25	.....	.....	.....	.....	175,000	Dec..	1888	.12½
30	Catalpa, S. L. I.	Colo..	3,000,000	300,000	10	*	.....	.....	.....	270,000	May	1884	.10
31	Centen'l-Eureka, S. L.	Utah.	1,500,000	30,000	50	.....	.....	.....	.....	232,500	April	1891	.50
32	Central, C.	Mich.	500,000	25,000	25	100,000	Oct..	1861	.65	1,970,000	Feb..	1891	1.00
33	Chrysolite, S. L.	Colo..	10,000,000	200,000	50	*	.....	.....	.....	1,650,000	Dec..	1884	.25
34	Clay County, G.	Colo..	2,000,000	200,000	1	*	.....	.....	.....	24,000	Mar..	1891	.02
35	Cœur D'Alene, S.	Idaho	500,000	500,000	10	*	.....	.....	.....	250,000	April	1891	.04
36	Colorado Central, S. L.	Colo..	2,750,000	275,000	10	*	.....	.....	.....	406,250	Aug..	1889	.05
37	Commonwealth, S.	Nev..	10,000,000	100,000	100	170,000	Nov..	1888	.50	20,000	Nov..	1890	.20
38	Confidence, S. L.	Nev..	.....	24,963	.....	328,880	May.	1890	.75	199,688	April	1889	1.00
39	Cons. Cal. & Va., S. G.	Nev..	21,600,000	216,000	100	108,000	Jan..	1885	.20	3,466,800	April	1890	.25
40	Contention, S.	Ariz..	12,500,000	250,000	50	.....	.....	.....	.....	†2,587,500	Dec..	1884	.25
41	**Cop. Queen Con., C.	Ariz.	1,400,000	140,000	10	.....	.....	.....	.....	210,000	Feb..	1890	.50
42	Cortez, S.	Nev..	1,500,000	300,000	05	*	.....	.....	.....	481,000	Feb..	1891	.06
43	Crescent, S. L. G.	Utah.	15,000,000	600,000	25	*	.....	.....	.....	228,000	Oct..	1888	.03
44	Crown Point, G. S.	Nev..	10,000,000	100,000	100	2,425,000	Sept.	1889	.50	11,588,000	Jan..	1875	2.00
45	Cumberland, L. S.	Mont.	5,000,000	500,000	10	*	.....	.....	.....	15,000	Nov..	1889	.03
46	Daly, S. L.	Utah.	3,000,000	150,000	20	.....	.....	.....	.....	1,912,500	April	1891	.25
47	Deer Creek, S. G.	Idaho	1,000,000	200,000	5	*	.....	.....	.....	20,000	June	1889	.05
48	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*	.....	.....	.....	‡1,000,000	Nov..	1887	.10
49	Derbec B. Grav., G.	Cal..	10,000,000	100,000	100	90,000	Dec..	1881	.10	240,000	Oct..	1890	.10
50	Dunkin, S. L.	Colo.	5,000,000	200,000	25	*	.....	.....	.....	390,000	Oct..	1889	.05
51	Dunstone, G. S. L.	Mont.	1,000,000	200,000	5	*	.....	.....	.....	6,000	Nov..	1888	.03
52	Eclipse, L. S.	Colo..	10,000	100,000	1	.....	.....	.....	.....	20,000	Nov..	1887	.10
53	Elkmora, S. L.	Mont.	1,000,000	200,000	5	*	.....	.....	.....	¶296,875	Dec..	1891	.50
54	Empire Lt., G.	Mont.	500,000	100,000	5	.....	.....	.....	.....	70,500	Oct..	1887	.37½
55	Enterprise, S.	Colo..	100,000	10,000	10	*	.....	.....	.....	106,000	May..	1888	1.00
56	Eureka Con., S. L., G.	Nev..	5,000,000	50,000	100	550,000	June	1889	.50	4,892,500	Oct.	1890	.25
57	Evening Star, S. L.	Colo..	500,000	50,000	10	*	.....	.....	.....	1,450,000	Dec..	1889	.25
58	Father de Smet, G.	Dak..	10,000,000	100,000	100	200,000	Nov..	1878	1.00	1,125,000	Dec..	1885	.20
59	Franklin, C.	Mich..	1,000,000	40,000	25	220,000	June	1871	.....	960,000	Jan..	1890	2.00
60	Freeland, S. G.	Colo..	5,000,000	200,000	25	*	.....	.....	.....	180,000	July.	1886	.10
61	Garfield Lt., G.	Nev..	500,000	100,000	5	.....	.....	.....	.....	90,000	April	1888	.12½
62	Gould & Curry, S. G.	Nev..	10,800,000	108,000	100	3,388,800	Sept.	1890	.25	3,826,800	Oct..	1870	10.00
63	Grand Prize, S.	Nev..	10,000,000	100,000	100	785,000	Jan..	1890	.30	495,000	Mar.	1884	.25
64	Granite, S. L.	Idaho	500,000	500,000	1	*	.....	.....	.....	28,400	Oct..	1889	.02
65	Granite Mountain, S.	Mont.	10,000,000	400,000	25	.....	.....	.....	.....	10,800,000	April	1891	.25
66	Green Mountain, G.	Cal..	1,250,000	125,000	10	*	.....	.....	.....	212,000	Nov..	1881	.07½
67	Hale & Norcross, G. S.	Nev..	1,200,000	112,000	100	5,142,800	April	1890	.50	1,822,000	Aug..	1888	.50
68	Hecla Con., G. L. C.	Mont.	1,500,000	30,000	50	.....	.....	.....	.....	1,650,000	Mar..	1891	.50
69	Hel'a Mg. & Red, S. L. G.	Mont.	3,315,000	663,000	5	*	.....	.....	.....	196,975	July.	1886	.06
70	Holmes, S.	Nev..	10,000,000	100,000	100	370,000	May.	1890	.25	75,000	April	1886	.25
71	Homestake, G.	Dak..	12,500,000	125,000	100	200,000	July.	1878	1.00	4,668,750	Mar..	1891	.10
72	Honorine, S. L.	Utah.	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept.	1887	.05
73	Hope, S.	Mont.	1,000,000	100,000	10	*	.....	.....	.....	233,252	April	1888	.25
74	Hora-Silver, S. L.	Utah.	10,000,000	40,000	25	*	.....	.....	.....	4,250,000	Mar.	1891	.50
75	Hubert, G.	Colo..	1,000,000	1,000,000	1	*	.....	.....	.....	247,000	Dec..	1889	.00½
76	Idaho, G.	Cal..	310,000	3,100	100	.....	.....	.....	.....	5,285,150	Mar..	1891	2.50
77	Illinois, S.	N. M.	100,000	10,000	1	*	.....	.....	.....	45,000	April	1889	.20
78	Iron Hill, S.	Dak..	2,500,000	250,000	10	134,000	July.	1889	.03	156,250	Nov..	1887	.07½
79	Iron Mountain, S.	Mont.	500,000	500,000	1	*	.....	.....	.....	120,000	Feb..	1891	.05
80	Iron-Silver, S. L.	Colo..	10,000,000	500,000	20	*	.....	.....	.....	2,500,000	April	1889	.20
81	Jackson, G. S.	Nev..	5,000,000	50,000	100	237,500	Nov..	1880	.20	6,000	Dec..	1891	.10
82	Jay Gould, G. S.	Mont.	2,000,000	40,000	5	*	.....	.....	.....	459,000	May.	1891	.04
83	Kearsarge, C.	Mica..	1,000,000	40,000	25	190,000	Oct..	1887	1.00	80,000	Jan..	1890	2.00
84	Kentuck, S. G.	Nev..	3,000,000	30,000	100	417,431	Dec..	1890	.33	1,350,000	Dec..	1886	.10
85	La Plata, S. L.	Colo.	2,000,000	200,000	10	*	.....	.....	.....	610,000	Sept.	1882	.30
86	Leadville Con., S. L.	Colo.	4,000,000	400,000	10	*	.....	.....	.....	423,000	April	1887	.05
87	Lexington, G. S.	Mont.	4,000,000	40,000	100	*	.....	.....	.....	565,000	Jan..	1885	2.00
88	Little Chief, S. L.	Colo..	10,000,000	200,000	50	*	.....	.....	.....	820,000	Dec..	1890	.05
89	Little Rule, S.	Colo..	500,000	500,000	1	.....	.....	.....	.....	13,000	Mar.	1891	.02
90	Mammoth, S. L. C.	Utah.	10,000,000	400,000	250	113,000	.....	1882	.25	880,000	April	1891	.10
91	Martin White, S.	Nev..	10,000,000	100,000	100	1,225,000	Oct..	1890	.25	140,000	Dec..	1886	.25
92	Mary Murphy, S. G.	Colo..	350,000	3,500	101	*	.....	.....	.....	175,000	May.	1888	5.00
93	Matchless, S. L.	Colo..	500,000	500,000	1	*	.....	.....	.....	15,000	Feb..	1891	.05
94	May Mazenpa, S. L.	Colo..	1,000,000	100,000	1	*	.....	.....	.....	107,500	Mar..	1891	.01
95	Minas Prietas, G. S.	Mex..	1,000,000	100,000	10	*	.....	.....	.....	350,000	Dec..	1890	.50
96	Minnesota, C.	Mich..	1,000,000	40,000	25	42,000	April	1886	1.00	1,820,000	Mar.	1876	.....
97	Mollie Gibson, S.	Colo..	5,000,000	1,000,000	5	*	.....	.....	.....	10,000	April	1891	.05
98	Monitor, G.	S. Dak	2,500,000	250,000	10	.....	.....	.....	.....	45,000	Oct..	1886	.03
99	Mono, G.	Cal..	5,000,000	50,000	100	76,000	Sept.	1890	.25	12,500	Mar.	1886	.25
100	Montana, Lt., G. S.	Mont.	3,500,000	660,000	5	*	.....	.....	.....	2,573,475	April	1891	.12½
101	Morning Star, S. L.	Colo..	1,000,000	100,000	10	.....	.....	.....	.....	90,000	Feb..	1891	.25
102	Moulton, S. G.	Mont.	2,000,000	400,000	5	*	.....	.....	.....	380,000	Dec..	1887	.07½
103	Mount Pleasant, G.	Cal..	150,000	150,000	1	*	.....	.....	.....	150,000	Feb..	1887	.30
104	Mt. Diablo, S.	Nev..	5,000,000	50,000	100	137,500	June	1880	2.00	180,000	Sept.	1890	.40
105	Napa, Q.	Cal..	700,000	100,000	7	.....	.....	.....	.....	410,000	April	1891	.10
106	Navajo, G. S.	Nev..	10,000,000	100,000	100	500,000	April	1890	.15	229,935	April	1889	.10
107	New California, G.	Colo..	80,000	160,000	5	*	.....	.....	.....	48,800	May.	1890	1.25
108	New Guston, S.	Colo..	550,000	110,000	5	.....	.....	.....	.....	787,000	April	1891	1.00
109	N. Hoover Hill, G. S.	N. C.	800,000	12,000	2½	*	.....	.....	.....	30,000	Dec..	1885	.06½
110	Northern Belle, S.	Nev..	5,000,000	50,000	100	425,000	Jan..	1884	8.00	2,400,000	April	1883	.50
111	North Belle Isle, S.	Nev..	10,000,000	100,000	100	395,000	April	1890	.20	250,000	May	1888	.50
112	North Star, G.	Cal..	1,000,000	100,000	10	.....	.....	.....	.....	360,000	April	1889	.50
113	Ontario, S. L.	Utah.	15,000,000	150,000	100	.....	.....	.....	.....	11,825,000	April	1891	.50
114	Ophir, G. S.	Nev..	10,000,000	100,000	100	4,210,640	April	1890	.50	1,595,000	Jan..	1891	1.00
115	Original, S. C.	Mont.	1,500,000	60,000	25	*	.....	.....	.....	138,000	Jan..	1889	.05
116	Oro, S. L. G.	Colo..	500,000	100,000	5	.....	.....	.....	.....	95,000	July.	1890	.20
117	Osceola, C.	Mich..	1,250,000	50,000	25	480,000	April	1876	1.60	1,497,500	April	1891	1.00
118	Parrot, C.	Mont.	1,800,000	180,000	10	.....	.....	.....	.....	804,000	Mar..	1891	.10
119	Peacock, S. G. C.	N. M.	2,000,000	200,000	10	*	.....	.....	.....	60,000	Nov..	1886	.....
120	Plumas Eureka, G.	Cal..	1,400,250	140,625	10	.....	.....	.....	.....	2,548,000	Oct..	1889	.37½
121	Plymouth Con., G.	Cal..	5,000,000	100,000	50	*	.....	.....	.....	2,225,000	Feb..	1891	.40
122	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100	.....	.....	.....	.....	1,770,161	Jan..	1891	1.50
123	" com., Q.	Cal..	5,700,000	57,000	100	.....	.....	.....	.....	643,867	July.	1882	.40
124	Quincy, C.	Mich..	1,000,000	40,000	25	200,000	Dec..	1862	.....	5,770,000	Feb..	1891	5.00
125	Reed National, S. G.	Colo..	500,000	500,000	1	*	.....	.....	.....	40,000	Dec..	1890	.01
126	Rialto, G.	Colo.	300,000	300,000	1	*	.....	.....	.....	3,000	April	1891	.01
127	Richmond, S. G.	Nev..	1,350,000	54,000	25	.....	.....	.....	.....	4,332,987	Jan..	1891	.62½
128	Ridge, C.	Mich..	500,000	21,000	25	219,939	Mar.	1886	.50	99,785	Feb..	1880	.50
129	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*	.....	.....	.....	585,000	Mar	1886	.05
130	Running Lode, G.	Colo..	1,000,000	1,000,000	1	*	.....	.....	.....	10,000	April	1891	.00½
131	Savage, S.	Nev..	11,200,000	112,000	100	6,634,000	Nov..	1889	.50	4,461,000	June	1869	3.00
132	Sheridan, S. G.	Colo..	333,000	3,330	100	*	.....	.....	.....	225,000	Dec.	1890	3.33½
133	Shoshone, G.	Idaho	150,000	150,000	.....	.....	.....	.....	.....	7,500	April	1889	.01
134	Sierra Buttes, G.	Cal..	2,225,000	122,500	10	.....	.....	.....	.....	1,492,250	April	1888	.12½
135	Sierra Nevada, S. G.	Nev..	10,000,000	100,000	100	6,236,910	May.	1890	.50	102,000	Jan..	1871	1.00
136	Sierra Nevada, S. L.	Idaho	1,000,000	1,000,000	1	*	.....	.....	.....	40,000	May..	1889	.02
137	Silver Cord, S. L. G.	Colo..	4,500,000	450,000	10	.....	.....	.....	.....	225,000	Nov.	1883	.25
138	Silver King, S.	Ariz..	10,000,000	100,000	100	130,000	Nov.	1890	.30	1,950,000	July.	1887	.25
139	Silver Mg. of L., S. L.	N. M..	500,000	500,000	1	.....	.....	.....	.....	350,000	Feb.	1891	.10
140	Small Hopes Con., S.	Colo..	5,000,000	200,000	20	*	.....	.....	.....	2,162,500	Oct..	1890	.10
141	Spring Valley, G.	Cal..	200,000	200,000	.....	50,000	Oct..	1886	.25	50,000	Jan..	1881	.25
142	Standard, G. S.	Cal..	10,000,000	10,000	100	100,000	June	1890	.50	3,595,000	June	1888	.05
143	Stormont, S.	Utah.	500,000	500,000	1	*	.....	.....	.....	155,600	Nov	1881	.05
144	St. Joseph, L.	Mo..	1,500,000	150,000	10	*	.....	.....	.....	1,974,000	Dec..	1890	.02
145	Tamarack, C.	Mich..	1,125,000	50,000	25	520,000	April	1885	3.00	1,999,000	May..	1891	4.00
146	Tombstone, G. S. L.	Ariz..	12,500,000	507,500	25	*	.....	.....	.....	1,240,000	April	1882	.10
147	United Verde, C.	Ariz..	3,000,000	300,000	10	*	.....	.....	.....	127,500	May	1890	.10
148	Viola Lt., S. L.	Idaho	750,000	150,000	5	.....	.....	.....	.....	337,500	Nov..	1888	.37½
149	Ward Con., S.	Colo..	2,000,000	200,000	10	.....	.....	.....	.....	20,000	Dec..	1889	.05
150	Woodslie, S. L.	Utah.	100,000	10,000	10	.....	.....	.....	.....	25,000	Oct..	1888	.25
151	Yankee Girl, S.	Colo..	2,500,000	250,000	10	.....	.....	.....	.....	1,405,000	April	1891	.50
152	Yellow Jacket, G. S.	Nev..	12,000,000	120,000	100	5,508,000	Mar.	1889	.50	2,184,000	Aug..	1871	2.50
153	Young America, G.	Cal..	.....	.....	.....	.....	.....	.....	.....	175,000	Jan..	1889	.10

NON-DIVIDEND PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and am't of last.		
1	Allegheny, S.	Colo..	$5,000,000	$500,000	$10	*	.....	.....
2	Alliance, S. G.	Utah.	100,000	100,000	1	$120,000	Feb..	1891 .20
3	Alouez, C.	Mich..	2,000,000	80,000	25	737,000	Feb..	1890 .20
4	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	112,500	Sept.	1890 .25
5	Alta, S.	Nev..	10,080,000	100,800	100	3,359,800	Sept.	1890 .50
6	American Flag, S.	Colo..	1,250,000	125,000	10	300,000	June	1887 .....
7	Amity, S.	Colo..	250,000	250,000	1	.....	.....	.....
8	Anchor S. L. G.	Utah.	3,000,000	150,000	20	410,000	June	1890 .20
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	5	.....	.....	.....
10	Astoria, G.	Cal..	200,000	100,000	2	*	.....	.....
11	Barcelona, G.	Nev..	5,000,000	300,000	25	*	.....	.....
12	Bechtel Con., G.	Cal..	10,000,000	100,000	100	173,500	.....	1883 .10
13	Belmont, G.	Cal..	500,000	500,000	1	*	.....	.....
14	Belmont, S.	Nev..	5,000,000	50,000	100	735,000	April	1886 .10
15	Best & Belcher, S. G.	Nev..	10,080,000	100,800	100	2,279,275	Aug..	1890 .25
16	Black Oak, G.	Cal..	3,000,000	300,000	10	*	.....	.....
17	Boston Con., G.	Cal..	10,000,000	100,000	100	170,000	Nov..	1883 .25
18	Bremen, S.	N. M..	5,000,000	500,000	10	*	.....	.....
19	Brownlow, G.	Colo..	250,000	250,000	1	.....	.....	.....
20	Brunswick, G.	Cal..	2,000,000	400,000	5	*	.....	.....
21	Buckeye, S. L.	Mont.	1,000,000	500,000	2	.....	.....	.....
22	Bullion, S. G.	Nev..	10,080,000	100,800	100	2,780,000	Dec..	1889 .25
23	Butte & Boston, C. S.	Mont.	5,000,000	200,000	.....	.....	.....	.25
24	Calaveras, G.	Cal..	500,000	500,000	1	*	.....	.....
25	Carisa, G.	Wy..	500,000	100,000	5	*	.....	.....
26	Carupano, G. S. L. C.	Ven..	200,000	100,000	2	*	.....	.....
27	Casbier, G. S.	Colo..	500,000	250,000	2	*	.....	.....
28	Cherokee, G.	Cal..	1,500,000	150,000	10	.....	.....	.....
29	Chollar, S. G.	Nev	11,200,000	112,000	100	1,540,000	Nov..	1883 .50
30	Cleveland, T.	Dak..	1,000,000	500,000	2	*	.....	.....
31	Colchis, S. G.	N. M..	500,000	50,000	10	.....	.....	.....
32	Colorado Silver	Colo..	1,625,000	325,000	5	.....	.....	.....
33	Comstock Tun.	Nev..	10,000,000	100,000	100	35,000	Mar.	1887 .15
34	Con. Imperial, G. S	Nev..	5,000,000	50,000	100	1,875,000	July.	1890 .05
35	Con. New York, S. G.	Nev	5,000,000	500,000	50	71,000	Nov.	1890 .15
36	Con. Pacific, G.	Cal..	6,000,000	60,000	100	198,000	June	1890 .10
37	Con. Silver, S.	Mo..	2,500,000	250,000	10	.....	.....	.....
38	Crescent, S. L.	Colo..	3,000,000	300,000	10	*	.....	.....
39	Crocker, S.	Ariz..	10,000,000	100,000	100	150,000	June	1890 .15
40	Crowell, G.	N. C..	500,000	500,000	1	.....	.....	.....
41	Cushonega, G.	Ga..	250,000	250,000	1	*	.....	.....
42	Dandy, G.	Colo..	5,000,000	500,000	10	.....	.....	.....
43	Decatur, S.	Colo..	1,500,000	300,000	5	*	.....	.....
44	Denver City, S.	Colo..	5,000,000	500,000	10	*	.....	.....
45	Denver Gold, G.	Colo..	300,000	60,000	5	.....	.....	.....
46	Dickens-Custer, S.	Idaho	2,100,000	420,000	5	.....	.....	.....
47	Durango, G.	Colo..	500,000	500,000	1	.....	.....	.....
48	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886 1.00
49	El Cristo, G. S.	U.S.C.	1,000,000	500,000	2	.....	.....	.....
50	El Dorado, G.	Cal..	1,000,000	250,000	4	*	.....	.....
51	El Talento, G.	U.S.C.	1,000,000	500,000	2	.....	.....	.....
52	Emmons, S. L.	Colo..	2,000,000	2,000,000	1	.....	.....	.....
53	Empire, S.	Utah.	100,000	100,000	10	*	.....	.....
54	Eureka Tunel, S. L.	Utah.	10,000,000	100,000	100	*	.....	.....
55	Exchequer, S. G.	Nev..	10,000,000	100,000	100	865,000	July.	1890 .25
56	Found Treasure, G. S.	Nev..	10,000,000	100,000	100	81,500	May.	1890 .25
57	Gogebic I. Syn., I.	Wis.	5,600,000	200,000	25	.....	.....	.....
58	Gold Cup, S.	Colo..	500,000	500,000	1	*	.....	.....
59	Golden Era, S.	Mont.	2,000,000	200,000	10	*	.....	.....
60	Gold Rock, G.	Cal..	1,000,000	500,000	2	*	.....	.....
61	Grenada, G.	Cal..	10,000,000	100,000	100	*	.....	.....
62	Grand Belt, C.	Tex	12,000,000	120,000	100	.....	.....	.....
63	Grand Duke	Colo..	800,000	80,000	10	.....	.....	.....
64	Great Remance, G.	U.S.C.	1,000,000	500,000	2	*	.....	.....
65	Gregory Con., G.	Mont.	3,000,000	300,000	10	.....	.....	.....
66	Harlem M. & M. Co., G.	Cal..	1,000,000	200,000	5	.....	.....	.....
67	Hartery Con., G.	Cal..	1,000,000	100,000	10	22,000	Oct..	1890 .05
68	Hecla Mont. & Tr., S. G.	Ariz.	10,000,000	100,000	100	.....	.....	.....
69	Hector, G.	Cal..	1,500,000	300,000	5	45,000	Jan..	1885 .15
70	Highland, C.	Mich.	500,000	25,000	20	.....	.....	.....
71	Holywood	Cal..	200,000	100,000	2	.....	.....	.....
72	Hortense, S.	Colo..	2,000,000	200,000	10	.....	.....	.....
73	Huron, C.	Mich..	1,000,000	40,000	25	280,000	May.	1887 3.00
74	Iron, Gold & Silver, S.	N. M.	2,000,000	200,000	10	*	.....	.....
75	Ironton, I.	Wis.	1,000,000	40,000	25	.....	.....	.....
76	Iroquois, C.	Mich.	1,250,000	50,000	25	..

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	April 18.		April 20.		April 21.		April 22.		April 23.		April 24.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo.													
Alice, Mont.	1.70		1.80	1.75			1.60						600
Argenta, Nev.													
Aspen, Colo.													
Atlantic, Mich.													
Bodie Con., Cal.													
Bos. & Mont., Mont													
Breece, Colo.													
Bulwer, Cal.													
Caledonia, S. Dak.	.72				.85								700
Calumet & Hecla.							259½						20
Chrysolite, Colo.					25				.24				200
Commonwealth, Nev.													
Comstock T. bonds, Nev.													
" scrip., Nev.													
Cons. Cal. & Va., Nev.			13.63		13.13				12.88	12.38			550
Crown Point, Nev.	2.90												100
Deadwood, Dak.	1.25												100
Eureka Cons., Nev.													
Father de Smet, S. Dak.	.45	.43											600
Franklin, Mich.													
Freeland, Colo.													
Gould & Curry, Nev.													
Granite Mountain, Mont.													
Hale & Norcross, Nev.													
Holyoke, Idaho.			.03		.03		.03		.03		.03		500
Horn-Silver, Utah.			3 55	3.50	3.50		3.50		3.50	3.40	3.63		2,860
Independence, Nev.													
Iron Hill, Dak.													
Kearsarge, Mich.													
Leadville Cons., Colo.	.12	.10			.11					.11			3,100
Little Chief, Colo.							.32						100
Mono, Cal.													
Moulton, Mont.													
Mt. Diablo, Nev.													
Navajo, Nev.													
N. Belle Isle, Nev.													
Ontario, Utah.													
Ophir, Nev.					7.50				7.50				200
Osceola, Mich.													
Plymouth, Cal.													
Quicksilver, Pref., Cal.													
" Com., Cal.													
Quincy, Mich.													
Robinson Cons., Colo.	.45						.45		.45	.40			363
Savage, Nev.													
Sierra Nevada, Nev.													
Silver Cord, Colo.													
Silver King, Ariz.													
Silver Mg. of L. V., N. M.													
Small Hopes, Colo.													
Standard, Cal.													
Stormont, Utah.													
Tamarack, Mich.													
Yellow Jacket, Nev.			3.30		2.75								200

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	April 18.		April 20.		April 21.		April 22.		April 23.		April 24.		SALES
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez, Mich.							3.63						50
Alpha, Nev.													
Alta, Nev.							1.15						100
American Flag, Colo.													
Andes, Nev.													
Amador, Cal.													
Astoria, Cal.	.03		.03		.01								7,000
Belmont, Cal.	.44	.43	.44		.44		.45		.45		.45		2,700
Best & Belcher, Nev.	7.88		5.63		6.75				7.50				400
Bonanza King, Cal.													
Brunswick, Cal.	.10		.10				.10		.10		.10		2,600
Bullion, Nev.	2.63												100
Butte & Bost., Mont.													
Castle Creek, Idaho.							.03						400
Challar, Nev.	3.30		3.05										285
Col. & Beaver, Idaho.													
Comstock T., Nev.	.21		.21						.21		.21		7,500
Con. Imperial, Nev.													
Cons. Pacific, Cal.													
Crescent, Colo.													
Del Monte, Nev.													
El Cristo, Rep. of Col.							.40		.37				800
Exchequer, Nev.													
Hollywood, Cal.													
Huron, Mich.							2.75						200
Julia, Nev.													
Justice, Nev.													
King. & Pembroke, Ont.													
Lacrosse, Colo.													
Lee Basin, Colo.													
Mexican, Nev.									1.50				100
Middle Bar, Cal.	.03		.03		.03		.03						6,000
Monitor, Colo.			.05	.04							.05	.04	800
Mutual S. & M. Co., Wash.			1.53				1.40	1.35					500
Nevada Queen, Nev.													
N. Commonwealth, Nev.													
Occidental, Nev.	1.25								1.25	1.20			500
Oriental & Mil., Nev.													
Overman, Nev.													
Phœnix of Ariz.			.55	.45	.56	.55	.53	.50	.54	.49			6,000
Phœnix Lead, Colo.													
Potosi, Colo.	5.13		4.90										300
Rappahannock, Va.											.02		1,000
S. Sebastian, S. Sal.													
Santa Fe, N. M.													
Scorpion, Nev.	.60												1,200
Seg Belcher, Nev.	1.60												300
Shoshone, Idaho.													
Silver Hill, Nev.			.35	.32									1,200
SilverQueen, Ariz.													
Sullivan Con., Dak.													
Sutro Tunnel, Nev.													
Syndicate, Cal.													
Union Cons., Nev.	4.25		4.15						4.00				300
Utah, Nev.													

*Ex dividend. †Dealt at in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 10,193. Non-dividend shares sold, 39,635. Total, New York, 49,828.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	April 17.		April 18.		April 20.		April 21.		April 22.		April 23.		SALES.
Atlantic, Mich	15.50						15.50						125
Bodie, Cal.													
Bonanza Development.													
Bost. & Mont., Mont.	42.50	42.00	43.00		42.50	42.38	42.50	41.75	42.00	41.75	42.50	41.75	1,925
Breece, Colo.					.40		.40						400
Calumet & Hecla, Mich.	260		260		262½	260	260						86
Catalpa, Colo.								.30					500
Central, Mich.													
Chrysolite Colo.													
Con. Cal. & Va., Nev.													
Dunkin, Colo.								.65		.65			1,000
Eureka, Nev.													
Franklin, Mich.										17.00			100
Honorine, Utah.													
Horn Silver, Utah.													
Kearsarge, Mich.	14.00				14.00	13.50				14.00	13.75		187
Little Chief, Colo.													
Little Pittsburg, Colo.													
Moulton, Mont.													
Napa, Cal.	5.00	4.75						4.75					600
Ontario, Utah.													
Osceola, Mich.			36.87		36.87	37.00	36.50	36.00	36.00	35.87	36.50	36.00	757
Quincy, Mich.	105	104							105½	105			212
Ridge, Mich.													
Sierra Nevada, Nev.													
Silver King, Ariz.													
Stormont, Utah.													
Tamarack, Mich.					150	150	150		150	148	150	148	414
Tecumseh, Mich.													

NAME OF COMPANY.	April 17.		April 18.		April 20.		April 21.		April 22.		April 23.		SALES.
Allouez, Mich.					3.50						3.50		200
Arnold, Mich.	4.55						.55		.55				225
Aztec, Mich.													
Brunswick, Cal.													
Butte & Boston, Mont.	15.38		15.25		15.75	15.50	15.75		15.25		16.25		1,105
Centennial, Mich.					15.75		16.13		16.25		15.75	15.25	565
Comstock, T., Nev.													
Copper Falls, Mich.													
Crescent, Colo.									.10				3,100
Dana, Mich.													
Don Enrique, N. M.													
El Cristo, S. A.													
Hanover, Mich.													
Humboldt, Mich.													
Hungarian, Mich.													
Huron, Mich.													
Mesnard, Mich.													
National, Mich.	3.00												75
Native, Mich.													
Oriental & M., Nev.													
Phœnix, Ariz.													
Pontiac, Mich.													
Rappahannock, Va.													
Santa Fe, N. Mex.	57½		.55		57½		.60		.62½	.60	.62½	.60	7,706
Shoshone, Idaho.													
South Side, Mich.													
Star, Mich.													
Washington, Mich.													
Winthrop, Mich.													

† Assessment paid. Boston: Dividend shares sold, 6,306. Non-dividend shares sold, 12,970. Total Boston, 19,276.

COAL STOCKS.

NAME OF COMPANY.	Par val. of shares.	April 18.		April 20.		April 21.		April 22.		April 23.		April 24.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal.														
Cambria Iron.		77												25
Cameron Coal & I. Co.														
Ches. & O. RR.	100													
Chic. & Ind. Coal RR.	100													
Do. pref.	100													
Col. C. & I.	100	36½	36¼	36¾	36¼	36⅞	36	37	36¼	37	36½	37¾	36⅝	5,614
Col. & Hocking C. I.	100									15⅞	15⅛			40
Consolidation Coal.	100													
Del. & H. C.	100	133½		134½				134		134		135	134	1,168
D., L. & W. RR.	50	135½	135	137¼	135⅝	137½	136¼	137	136⅛	137¼	137	139	136⅝	61,475
Hocking Valley	100			25¼		24¾		25¼	25	25	24⅞	25¼	25⅛	8 5
Hunt. & Broad Top.				22¼	21¾	21½								510
Do. pref.		45				44		44		44				113
Illinois C. & Coke Co.														
Lehigh C. & N.	50	47		47¼	47⅛	47¼	47⅛	48		48¾	48			1,094
Lehigh Valley RR.	50	48⅝	48½	48⅝	48⅜	48⅜	48⅛	48⅜	47¼	48½	48⅛			1,023
Lehigh & Wilk. Coal	100													
Mahoning Coal.	100													
Do. pref.	100			109½	109									110
Maryland Coal.						16¾	16⅛					16½		650
Morris & Essex.	100													
New Central Coal.	50					10								340
N. J. C. RR.	100			119	118	118⅞	117	118		118¾	118	120¼	118	5,625
N. Y. & S. Coal.	100													
N. Y., Susq. & West	100			8⅝	8	8¼	8	8		8¾	8	8⅛	8	3,520
Do. pref.	100	31⅝	31½	32				22¾	32½	32⅞		33⅛	33	1,460
N. Y. & Perry C. & I.	100													
Norfolk & West. RR.	50			14½						15½				500
Do. pref.	50			54½		54⅛	53⅞	54				54		324
Penn. Coal.	50													
Penn. RR.	50	51⅞	51¾	52⅛	51¾	52⅛	52	52⅜	52	52½	52¼			5,123
Ph. & R. RR.		32⅞	32¾	34	33	33¾	33½	33¾	33	33¾	33⅝	34	33⅜	**25,607
Sunday Creek Coal.														
Do. pref.	100													
Tennessee C. & I. Co.		35	34	35¾	34½	35¾	35	35¾	35	35¼		35½	34¾	4,740
Do. pref.														
Westmoreland Coal.														

**Sales in New York, 10,995; in Philadelphia 14,612. Total sales, 123,586.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS.					
	April 17.	April 18.	April 20.	April 21.	April 22.	April 23.
Alpha.						
Alta.	1.10	1.30	1.35	1.25		1.15
Belcher.						
Belle Isle.	.60	.60	.55	.80		.65
Best & Bel.	7.50	7.00	6.63	5.50		6.75
Bodie.	1.20	1.45	1.30	1.30		1 25
Bulwer.	.40	.40	.40	.40		.40
Challar.	3.50	3.25	3.25	3.10		2.90
Com'wealth	.80	.80	.80	.80		.80
Con. C. & V.	13.25	13.01	13.00	12.75		12.63
Con Pacific.						
Crown Point.	2.80	2 75	2.65	2.60		2.50
Del M'te, Nev.						
Eureka C.		3.50	3.50	3.75		3.75
Gould & C.	3 60	3.45	3.35	3.30		3.20
Hale & N.	3.85	3.55	3.40	3.40		3.30
M. White.						
Mexican.	4.75	4.45	4.35	4.15		3.95
Mono.	.70	.65	.80	.70		.65
Mt. Diablo.						
Navajo.	.25	.35	.30	.30		.30
Nev. Queen.	.40	.55	.55	.50		.55
N. Belle Isle.	.85	.75	.80	.80		.85
N. Com'w'lth.				.70		
Ophir.	8.13	7.50	7.50	8.00		6.63
Potosi.	4.90	4.55	4.60	4.40		4.40
Savage.	3.40	3.20	3.25	3 30		3.25
Sierra Nev.	3.55	3.45	3.35	3.15		3.15
Union Con.	4.15	4.00	3.85	3.75		3.70
Utah.	1.25	1.15	1.10	1.05		1.10
Yellow Jak.	3.05	2.95	2.90	2.80		2.70

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L.	Asked. H.
Atlantic Coal	1.05	$1.50
Balt. & N. C.	.05	.12@.14
Big Vein Coal	....	1.10
Conrad Hill	....	.10
Cons. Coal	.24	....
Diamond Tunnel	....	....
George's Crk. C.	....	1.15
Lake Chrome	.13	.15
Maryland & Charlotte	....	....
North State	....	....
Silver Valley	.60	.70

Prices bid and asked, lowest and highest, during the week ending April 23.

Birmingham, Ala. April 25.

COMPANY.	Bid. L. H.	Asked L. H.
Ala. Coal & I. Co.	....	$100
Ala. Conn. C. & C. Co.	....	$23
Ala. R. Mill Co.	$100	....
*Alice Furnace	$100	....
Anna Howe G. Mg. Co.	$¼	$½
Bessemer Land	$29	$30
Bir. Mg. & Mfg.	....	$35
Cahaba Coal Mg. Co.	....	$61
Camille Gold Mg. Co.	$½	$¾
De Bardeleben C. & I. Co.	$8½	$9⅛
Decat. L. Imp.	$8¾	$9⅛
Decatur Min. L.	....	$19
Ensley Land	$7½	$9
*Eureka	....	....
Florence L. & Mg. Co.	....	$18¼
Gadsen Land	$3⅜	$3⅞
Hecla Coal Co.	....	....
Hen. S. & M. Co.	$2¾	$4¼
Jagger-Towni'y C. & C. Co.	$8½	$10
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	....	$25
Sheffield C. & I. Co.	$52½	$55
Sloss I. & S.	$18¼	$21
†Sloss I. & S.	$85	$87
‡‡ Sloss I. & S.	$49	$52½
Tuscaloose C. I. & L. Co.	....	$24
Ten. C. & I. Co.	$32½	$35
" pref.	$86	$88
Vulcan C. & C. Co	$5	$7½
Woodstock I. Co.	$28	$29

* Bonds. † First mortgage. ‡‡ Second mortgage. ** Without interest.

Pittsburg, Pa. April 23.

COMPANY.	B.	A.	Closing.
Allegheny Gas Co.	$.....	$.....	$.
Bridgewater Gas Co.	45.00	48.00	45.00
Chartiers Val. Gas	....	10.50	6.25
Columbia Oil Co.	1.00	3.00	1.00
Consignee Mg. Co.	.20	.50	.20
Consolidated Gas Co.	40.00	.....	40.00
East End E. Light Co.	.....	.....	.....
East End Gas Co	.....	.....	.....
Forest Oil	.....	.....	.....
Hazlewood Oil Co.	.....	.....	.....
La Noria Mining	.35	.50	.40
Luster Mg. Co.	13.38	14.00	14.00
Mansfield C. & C. Co.	.....	.....	.....
Manuf'turers Gas Co.	21.00	25.00	24.00
Nat. Gas Co. of W. Va	57.50	60 00	60.00
N.Y.& Clev.Gas Coal.	36.00	40.00	38.00
Ohio Valley Gas	.....	.....	.....
Pennsylvania Gas	.....	11.00	11.00
People's Natural Gas.	.....	30.00	30.00
People's N. G. & P. Co.	9.00	.....	9.00
Philadelphia Co.	13.00	13.13	13.00
Pine Run Gas Co.	.....	.....	.....
Pittsburg Gas	70.00	.....	70.00
Silverton Mg. Co.	1.75	1.88	1.75
Sterling Silver Mg. Co.	4.00	5.00	4.00
South Side Gas	.....	.....	.....
Tuna Oil Co.	55 00	60.00	60.00
Union Gas	.....	.....	.....
Washington Oil Co.	80.00	85.00	80.00
W'house Brake Co.	.....	.....	.....
W'house A. B. Co.	90.00	92.00	92.00
W'house E. Light.	13.75	13.88	13.75
W'moreland & Camb.	.....	.....	.....
Wheeling Gas	15.00	.....	15.00
Yankee Girl Mg	.....	.....	.....

St. Louis. April 22.

CLOSING PRICES.

COMPANY.	H.	L.
Adams, Colo.	$1.85	$1.55½
American & Nettie	.36¼	.32½
Aztec, N. Mex.	.18	.12½
Bi-Metallic	34.50	34.00
Central Silver	.63	.02½
Cleveland, Colo.	.....	.....
Elizabeth	3.00	1.95
Gold King	.12	.10
Granite Mountain, Mont.	26.00	25.75
Hope	.....	.....
Ingram	.....	.....
L. X. L. Colo.	.....	.....
La Union	.....	.....
Little Albert	.11½	.10½
Montrose Placer, Colo.	.70	.70
Major Budd, Mont.	.....	.....
Mexican Imp.	.....	.....
Mickey Breen	1.25	1.12½
Mountain Key	.....	.....
Nellie	.12	.....
Old Colony	.....	.....
Pat Murphy, Colo.	.....	.....
Puzzle	.....	.....
Richmond Hill	.....	.....
Samoa	.....	.....
Silver Age, Colo.	2.07½	2.07½
Small Hopes, Colo.	.80	.75
Tourtelotte	.....	.....
West Granite, Mont.	.....	.....
Wire Patch	.....	.....
Yuma, Ariz.	.68¾	.68¾

Trust Stocks. April 24.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

Am. Cotton Oil. Com	$28 @$28½
" " " Pfd	52 @ 52½
" " " Fr. Repts	27 @ 27¼
Am. Sugar Refineries, Com.	90¼ @ 90¾
" " " Pfd	91¾@ 92
Distillers' & Cattle Feeders'.	47 @ 47½
Linseed Oil	40 @ 41
Standard Oil	163 @167½
National Lead	20 @ 20⅛
W. W. Beef Co	10 @ 15

Trust Receipts.

Sales at the New York Stock Exchange week ending April 24:

	Sales.	Price— H.	L.
*American Cotton Oil.	14,105	28¼	25⅝
National Lead	39,716	20¼	19⅛

* Trust receipts.

Foreign Quotations.

London. April 10.

COMPANY.	Highest.	Lowest.
Almada, Mex.	£3-16	£1-16
Amador, Cal.	7s. 6d.	6s. 6d.
Appalachian, N. C.	6d.	3d.
Canadian Phos., Can.	£1⅛	£1⅛
Colorado, Colo.	3s. 6d.	3s.
Comstock, Utah	....	....
Cordova	....	....
Cons. Esmeralda, Nev.	2s. 6d.	2s.
Denver Gold, Colo.	6d.	....
Dickens Custer, Idaho.	2s.	1s. 6d.
East Arevalo, Idaho.	2s.	1s.
El Callao, Venezuela	....	....
Elmore, Idaho	1s. 9d.	1s. 3d.
Garfield, Nev	1s.	3d.
Jay Hawk, Mont.	3s.	2s. 6d.
Josephine, Cal.	1s.	1d.
Kohinoor, Colo.	1s. 3d.	9d.
La Luz, Mex.	1s. 6d.	1s.
La Valera, Mex.	£1¼	£⅞
Montana Lt., Mont.	14s.	13s.
New California, Colo.	5s. 3d.	4s. 9d.
New Consolidated	9d.	3d.
New Eberhardt, Nev.	1s. 6d.	1s.
New Emma, S. Utah.	3s. 9d.	3s. 3d.
Newfoundland, N. F.	3s. 6d.	3s.
N. Gold Hill, N. C.	2s.	1s. 6d.
New Guston, Colo.	£3¾	£3¼
New Hoover Hill, N.C.	2s. 6d.	....
Old Lout, Colo	.....	.....
Palmarejo, Mex.	13s. 6d.	12s. 6d.
Pinos Altos, Mex.	7s. 6d.	6s. 6d.
Pittsburg Cons., Nev.	7s.	6s. 6d.
Richmond Con., Nev.	£1⅛	£⅞
Ruby&Dunderb'g, Nev.	1s. 6d.	1s.
Sam Christian, N. C.	1s. 3d.	9d.
Sierra Buttes, Cal.	5s.	4s.
" Plumas Eur., Cal.	£9-16	£7-16
Sonora, Mex.	....	....
United Mexican, Mex.	5s.	4s.
U. S. Placer, Colo.	6d.	....
Viola Lt., Idaho	1s. 3d.	9d.
Yankee Girl, Colo.	£9-16	£7-16

Paris. April 9.

	Francs.
Belmez, Spain	845.00
Callao, Venez	37.50
Callao Bis., Venez	14.00
East Oregon, Ore.	3.50
Forest Hill Divide, Cal.	85.00
Golden River, Cal.	130.00
" " parts	30.00
Lexington, Mont	97.50
" parts	2 75
Rio Tinto, Spain	597.00
Tharsis, Spain	170.00

CURRENT PRICES.

Those quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, No. 8, pure, 1,040, ℔ lb.	.08
in bbls. and cbys.	.06
Carbonic, liquefied	.40
Chromic, ch pure	1.00
for batteries	.50
Hydrobromic, dilute, U. S. P.	.35
Hydrocyanic, U. S. P.	.55
Hydrofluoric	.30
Alcohol—95%, ℔ gall.	2.10
Absolute	4.00
Ammoniated	3.00
Alum—Lump, ℔ lb.	.03
Ground, ℔ lb.	04
Lump ℔ ton, Liverpool	£4 17 6
Sulphate of Alumina, ℔ ton	£4 10
Alumina Chloride—Pure, ℔ lb.	1.25
Sulphate, commercial	.06
pure crystals.	1 00
Ammonia—Sul., ℔ 100 lbs.	3.15@3.25
Carb, ℔ lb.	.14
Aqua Ammonia—(in cbys) 18° ℔ lb.	4½@6
20°, ℔ lb.	6@7
22°, ℔ lb.	6@7
26°, ℔ lb	10@11
Ammoniates—Azotine, ℔ unit	1 85@ 1 90
Concentrated tankage, ℔ unit	1 75@ 1 80
Bones, rough, ℔ ton	20 00@23 00
ground, ℔ ton	25 00@28 00
Bone black, refuse, ℔ ton	18 00@19 00
Kieserite	6 00@ 6 50
Fish guano, dried	19 50@20 00
acidulated	9 00@10 00
wet	8 50@ 9 50
Acid phosphate, 14% per unit.	72½@ 80
Argols—Red, powdered, ℔ lb.	.15
Arsenic—White, powdered ℔ lb.	3@3¼
Red ℔ lb.	5@ ½
White at Plymouth, ℔ ton	£12 2 6
Asbestos—Am., ℔ ton	$50@$300
Italian, ℔ on. c. i. f. L'pool	£18@£60
Ashes—Pot, 1st sorts, ℔ lb.	4¾@4⅞
Pearl	6¼@6½
Asphaltum—P. ton	13.00
Prime Cuban, ℔ lb.	4½@5½c.
Hard Cuban, P ton	$28.00
Trinidad, refined, ℔ ton	$30.00
Egyptian	8@9
Barium—Nitrate, ℔ lb.	8@8½
Barytes—Sulph., Am. prime white	17@20
Sulph., foreign, floated, ℔ ton.	19½@21.50
Sulph., off color, ℔ ton	11.50@14.00
Carb., lump, f. o. b. L'pool, ton	£6
No. 1, Casks, Runcorn, " "	£4 10 0
No. 2, bags, Runcorn, " "	3 15 0
Bichromate of Potash—Scotch.	10@12
American	10@12
Bichromate of Soda	8½@11½
Borax—Refined, ℔ lb.	9½@9⅝
Concentrated	8¼@8½
Refined " Liverpool ℔ ton	£29
Bromine—℔ lb.	.55
Cadmium Bromide—℔ lb.	2.00
Iodide, ℔ lb.	5.50
Chalk—℔ ton	1.75
Precipitated, ℔ lb.	4¾@5
China Clay—English, ℔ ton.	13½@21.00
Southern, ℔ ton	13.50
Chrome Yellow—℔ lb.	10@25
Chromalum—Pure, ℔ lb.	.40
Commercial, ℔ lb.	1.12
Cobalt—Oxide, ℔ lb.	2.50@2.90
Copper—Sulph. English Wks. ton	£20@ £21
Copperas—Common, ℔ 100 lbs.	70
Best, ℔ 100 lbs.	75@1.00
Liverpool, ℔ ton, in casks.	£1 15s.
Corundum—Powdered, ℔ lb.	4½@.9
Flour, ℔ lb.	.3
Cream of Tartar—Am. 99%.	24½
Powdered, 99 p. c.	25
Cryolite—Powdered, ℔ lb.	.12
Emery—Grain, ℔ lb. (℔ kg.)	4½@5
Flour, ℔ lb.	2½@10
Epsom Salt—℔ lb.	.4
in lbs.	.1½
Feldspar—Ground, ℔ ton	20.00
Flint—Pure, ℔ ton	20.00
Fluorspar—Powdered, No. 1, ℔ ton.	30 00
Fuller's Earth—Lump, ℔ bbl.	90@95
Powdered, ℔ lb.	1¾@2
Gypsum—Calcined, ℔ bbl.	1.25@1.50
Iodine—Resublimed	2.75
Kainit—℔ ton	$9.75@$10
Kaolin—*See China Clay.*	
Lead—Red, ℔ lb.	6¾@9
White, American, in oil, ℔ lb.	6½@7¼
White, English, ℔ lb.	8½@8¾
Acetate, or sugar of, white	12@13
Nitrate	9@10
Lime Acetate—Amer. Brown 1	10@1.20
" Gray	2.00@2.15
Litharge—Powdered, ℔ lb.	6½@7¼
English flake, ℔ lb.	9@9½
Magnesite—Greek, ℔ ton	20.00
Manganese—Crude, per unit	23@28
Oxide, ground, per lb.	2½@6½
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb.	.89
Powdered, ℔ lb.	.99
Metallic Paint—Brown per ton.	$20@25
Red	$20@25
Mineral Wool—℔ lb	2
Mica—In sheets according to size, 1st quality, ℔ lb.	25@$6.00
Naphtha—Black	60
Ochre—Yellow, "B. F.," ℔ ton, f. o. b. mill	30.00
"J. F. L. S.," ℔ lb. ex dock	2½
Yellow	10@25
Rochelle	1.35@1.50
Washed Dutch	5@—
Washed French	1¼@1⅝
Washed Nat Oxford, Lump	6½@6¾
Washed Nat Oxford, Powder	7@7½
Golden	3¾@4
Domestic	¾@1¼
Domestic, for O. C. & W. P.	⅜@1
Oils, Mineral	
Cylinder, light filtered	15@20
Dark filtered	11@15
Extra cold test	18@20
Dark steam refined	10@18
Phosphorus—℔ lb.	64@65
Precip., red	100@102
white	100@103
Plumbago—Ceylon, ℔ lb.	4@5
American, ℔ lb.	5@7
Potassium—Cyanide, ℔ lb., C. P.	70
Special	50
Fused	40
Bromide, ℔ lb	33
Chlorate, English, ℔ lb	11@14
Chlorate, powdered	13@14
Carb, ℔ lb.	4.70@5.54
Caustic, ℔ lb.	7½@8
Iodide	2,65@2.70
Muriate, ℔ 100 lbs.	1.82½
Nitrate, refined, ℔ lb.	6@8
Bichromate, ℔ lb.	10½@11
Dble. m'ure salt, basis of 48@50%	1.07½
Sulphate, basis of 90% ℔ 100 lbs.	2.05
Yellow Prussiate	32½@35
Red Prussiate	42@45
Pumice Stone—Select lumps, lb.	3¼
Original cks., ℔ lb	1¾@2
Powdered, pure, ℔ lb	2 @2½
Pyrites—Non-cupreous, p. units	10d.
Quartz—Ground, ℔ ton	14.00@16.00
Rotten Stone—Powdered, ℔ lb.	3¼@3½
Lump, ℔ lb.	6@10
Original cks	4½@5½
Rubbing stone	7
Salt—Liverpool, ground, ℔ sack	75@80
Turk's Island, ℔ bush	25@28
Salt Cake—℔ ton	70@80
Saltpeter—Crude, ℔ lb.	3¾@4¾
Refined, ℔ lb.	6@8
Silex, ℔ ton	14@25
Soda—Nitrate	1.80@1.85
Prussiate	17½@18
Phosphate	7@18
Stannate	8@15
Strontium—Nitrate, ℔ lb.	9½@10
Sylvinit, 23@27%, S. F. P., per unit.	40c@42½
Talc—Ground French, ℔ lb.	1¼@1½
Domestic, ℔ ton	$18@$20
c. i. f. Liverpool, ℔ ton	£4 5
Terra Alba—French	90@1.00
English	75@80
American, No. 1	—@—
American, No. 2	40@50
Tin—Crystals	15¾@16
Muriate	8@ 3
Vermillion—Imp. English	90 @ .95
Am. quicksilver, bulk	67 @—
Am. quicksilver, bags	68 @ .71
Chinese	95 @1 00
Trieste	90 @ .95
American	11½@ .12
Artificial	8 @ .35
Vitriol—(Blue), Ordinary, ℔ lb.	4 @4½
Extra, ℔ lb.	4½@4¾
Zinc Oxide—Am., Dry, ℔ lb.	4½
Antwerp, Red Seal, ℔ lb.	6@6½
Paris, Red Seal, ℔ lb	6½@7

* Spot.

THE RARER METALS.

Aluminum—Pure, per lb.	$1.00
94-97%, per lb	.90
Arsenic—(Metallic), per lb.	.40
Barium—(Metallic), per gram.	4.00
Bismuth—(Metallic), per lb.	2.75
Cadmium—(Metallic), per lb.	1.00
Calcium—(Metallic), per gram.	10.00
Cerium—(Metallic), per gram.	7.50
Chromium—(Metallic), per gram.	1 00
Cobalt—(Metallic), per lb.	6.00
Didymium—(Metallic), per gram.	9.00
Erbium—(Metallic), per gram.	7.50
Gallium—(Metallic), per gram.	140.00
Glucinum—(Metallic, per gram.	12.00
Indium—(Metallic), per gram.	9.00
Iridium—(Metallic), per oz.	7.00
Lanthanum—(Metallic), per gr.	10.00
Lithium—(Metallic), per gram.	10.00
Magnesium Per lb.	4.50
Manganese—(Metallic), per lb.	1.10
Chem. pure, per oz.	10.00
Molybdenum—(Metallic), per gm	.50
Niobium—(Metallic), per gram.	5.00
Osmium—(Metallic), per oz.	65.00
Palladium—(Metallic), per oz.	35 00
Platinum—(Metallic), per oz.	20.00@25.00
Potassium—(Metallic), per lb.	28.00
Rhodium—(Metallic), per gram.	5.00
Ruthenium—(Metallic), per gm.	5.50
Rubidium—(Metallic), per gram.	2.00
Selenium—(Metallic), per oz.	1.80
Sodium—(Metallic), per lb.	2.50
Strontium—(Metallic), per gm.	.60
Tantalum (Metallic), per gram.	9.00
Telurium—(Metallic), per lb.	5.00
Thallium—(Metallic), per gram.	.25
Titanium—(Metallic), per gram.	2.25
Thorium—(Metallic), per gram.	17.00
Tungsten—(Metallic), per lb.	1.00
Uranium—(Metallic), per lb.	5.00
Vanadium—(Metallic, per gm.	22.00
Yttrium—(Metallic), per gram.	9.00
Zirconium—(Metallic), per oz.	65.00

BUILDING MATERIAL.

Bricks—Fronts, nominal, ℔ 1,000	..
Croton	14.00@16.00
Wilmington	20.00@21.00
Philadelphia	@22.00
Trenton	@22.00
Baltimore	.....
Building Stone—Amherst freestone, ℔ cu. ft.	95@1.00
Brownstone, ℔ cu. ft.	1.00@1.35
Granite, rough, ℔ cu. ft.	45@1.25
Granite, Scotch, ℔ cu. ft.	1.00@1.15
Cement—Rosendale, ℔ bbl.	85@1.10
Portland, American, ℔ bbl.	2.15@2.45
Portland, foreign, ℔ bbl.	2.40@2.50
Portland, " special brands	2.60@2.85
Roman, ℔ bbl.	2.75@2.90
Keene's coarse, ℔ bbl.	4.50@5.50
Keene's fine, ℔ bbl.	7.25@8 50
Slate—Purple and green roofing, ℔ 100 ft.	7.00@7.50
Red roofing, ℔ 100 sq. ft.	12.00
Black roofing, ℔ 100 sq. ft.	4.25@5.50
Lime—St. John, com and finish., ℔ bbl.	85@ .9
Glens Falls, com. and fin., ℔ bbl.	85@1,